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A NOTE ON THE MEASUREMENT OF DIASTOLIC AND SYSTOLIC BLOOD PRESSURE BY THE PALPATION OF ARTERIAL VIBRATIONS (SOUNDS) OVER THE BRACHIAL ARTERY

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THE circumstances under which this method was first used by the author are familiar to those who habitually measure blood pressure. One day (May 15, 1939) I found myself in an elderly patient's home without a stethoscope. My special interest in the diastolic pressure was aroused when, listening with the bare ear, I heard an amphoric second heart sound not only over the aortic and pulmonic areas but also over the back of the chest on the left side. It occurred to me that I might feel with my fingers the "sounds" by which blood pressure is judged when a stethoscope is applied over the brachial artery, and so determine the diastolic pressure. On attempting to locate this artery in the right arm I found the pulsations rather weak; the artery was deeply placed and the arm was moderately fat. Retaining the thumb at the site of the brachial artery in the cubital fossa, I pumped the cuff up to above 250 mm. hg. Then, allowing the pressure to fall gradually, at 210 mm. hg. I began to feel a faint sharp sensation which was definitely not a pulsation. This sensation became stronger as the air was released, until at 190 mm. both arterial pulsation and the sharp sensation were felt. As the air was released further I became aware of the difficulty of dissociating these two elements. I therefore began again. This time, however, the pressure exerted by the thumb over the artery before inflating the cuff was reduced so that the threshold of feeling the pulsations was reached; a slight increase of this pressure, and the pulsation became well defined; a slight decrease and it could not be felt. While maintaining the thumb in this position I was able to feel the vibrations which the ear detects as sounds when the stethoscope is used in measuring blood pressure. The first "click" was felt at the level of 210 mm. hg. The short, sharp, sensation became stronger as air escaped and the mercury column fell to 170; then it weakened until the 130 level, below which it became stronger than ever, seemed strongest at 115 mm. hg., after which no sensations could be felt. As the mercury column fell to zero a slight increase in pressure exerted by the thumb made the arterial pulsation palpable, a slight lifting caused total stillness to reign under the thumb. Thus, the blood pressure was measured as 210 systolic and 115 diastolic by holding the thumb over the site of the brachial artery firmly enough to feel the vibrations that are customarily detected by the ear with the aid of the binaural stethoscope, but lightly enough to escape feeling arterial pulsation.

Subsequently I systematically practised first this palpation technique, then the usual auscultatory method on 100 patients, varying in age from two months to eighty-six years. The results of this study, shown in the accompanying table, indicate that both systolic and diastolic blood pressure levels can be measured with equal accuracy by the two methods, for the palpation technique causes the "vibratory sense" to function in detecting the same vibrations which the "sense of hearing" translates into sounds. All the familiar advantages and disadvantages of the usual auscultatory method are experienced in using this palpation method. The sharp change in amplitude at the transition from the fourth phase (loud sounds) to the fifth phase (faint

TABLE I.
COMPARISON OF SYSTOLIC AND DIASTOLIC BLOOD PRESSURE MEASUREMENTS IN ONE HUNDRED PATIENTS* BY PALPATION (VIBRATORY SENSE) AND AUSCULTATION

Systolic pressure		*No. of cases*
Palpation and auscultation, no difference		50
Higher by palpation	2-4 mm. hg.	10
" " "	6-10 mm. hg.	14
" " "	12-20 mm. hg.	0
Lower by palpation	2-4 mm. hg.	19
" " "	6-10 mm. hg.	7
" " "	12-20 mm. hg.	0
Total		100

Diastolic pressure		*No. of cases*
Palpation and auscultation, no difference		56
Higher by palpation	2-4 mm. hg.	18
" " "	6-10 mm. hg.	7
" " "	12-20 mm. hg.	0
Lower by palpation	2-4 mm. hg.	15
" " "	6-10 mm. hg.	4
" " "	12-20 mm. hg.	0
Total		100

* This group of patients includes 70 medical and surgical cases in the wards and 10 ambulatory patients of the cardiac clinic of the Montreal Jewish General Hospital, 12 private patients seen in their homes and 8 in office practice. Their ages vary between two months and 85 years, and the clinical diagnoses cover a wide range of pathological conditions. The systolic blood pressures varied between 80 and 260 mm. hg. and the diastolic between 50 and 120 mm. hg.

sounds or disappearance of sounds) is somewhat more striking with vibration sense as the receptor. Usually not much attention is devoted to gauging the degree of pressure used in applying the stethoscope over the brachial artery. Especially when the artery is rather superficial very little pressure of the stethoscope accentuates and prolongs the fifth phase. In this respect the palpation technique offers an advantage in training the observer to apply his "receptor" over the brachial artery with measured care. The gentle application of the thumb over the brachial artery, with a degree of firmness just sufficient to feel pulsation faintly but definitely, reveals that during the first four phases the volume of pulsation is greater than before constriction of the brachial artery. Moreover, the well known large amplitude pulsations of the fourth phase become more sharply defined in contrast with the faint pulsations of the fifth phase. In some instances both the vibrations and the pulsations may be discerned, the vibrations seem superimposed upon the pulsations. Under these conditions the sudden change in volume of pulsations from large to very small ones, and the equally sudden and simultaneous disappearance of vibrations, mark the diastolic blood pressure level with satisfying sharpness.

In the case of an obese woman of 62 years the "auscultatory gap" was equally well defined by both palpation and auscultation. Thus with the palpation technique the systolic pressure of 210, the disappearance of vibrations at 170, their reappearance at 120 and final disappearance at the diastolic pressure level of 90 mm. hg. were clearly determined. Further observation revealed that during the period between 170 and 120 when vibrations could not be detected by either palpation or auscultation the amplitude of brachial artery pulsation gradually increased as would be expected with reduction in air pressure within the cuff. In two patients with marked aortic insufficiency (examined after completion of the observations on the 100 cases described in the Table) the loud "sounds" could be heard, and the vibrations were felt at a distance of 1 cm. to the right or left of the brachial artery. These observations add evidence to indicate that the vibrations, and not arterial pulsation, are felt by the lightly applied thumb.

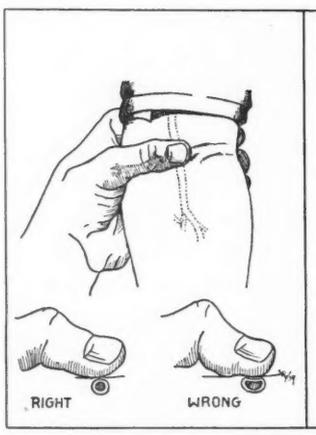

Fig. 1

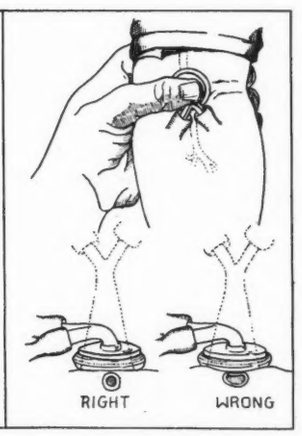

Fig. 2

Fig. 1.—As the observer holds the patient's extended arm in his hand the thumb can be applied over the brachial artery with finely measured firmness. After finding the threshold of firmness required to just escape feeling pulsation the thumb is retained at this level as the cuff is inflated and gradually deflated. While the pressure falls the systolic level is determined by the first sensation of a faint vibration and the diastolic by the sudden disappearance of the now stronger vibrations. **Fig. 2.**—If the stethoscope is applied firmly enough to cause a deformity of the artery, the fifth phase sounds become so loud that there is confusion in determining the end of the fourth phase. In practising the auscultatory method the stethoscope must be applied with a degree of firmness sufficient to keep it in contact with the skin but lightly enough to avoid compressing the artery.

As this study was designed to compare the palpation technique with the usual auscultatory method, all the observations described in the table were made by one person. Any other plan would have introduced a number of confusing variables. However, it is obviously of interest to know how readily this palpation technique can be learnt and what results others obtain with it. For this purpose, twenty members of the staff of the Montreal Jewish General Hospital were instructed in the palpation technique and their observations were checked by the author. Among these, there were five nurses, five house officers, five junior and five senior physicians. Only one description of the principle and the technique was necessary in most instances, and all were able to measure systolic and diastolic blood pressure with equal accuracy by both vibratory sense and hearing.

Ever since Vierordt[1] first measured systolic blood pressure (1853) by determining the weight required to obliterate the radial pulse, it became habitual to feel this artery in using the more practical manometric methods of von Baasch, Potain, Riva-Rocci, and Leonard Hill and Barnard.[2] Nothing could be more natural; the pulse has been felt "officially" at the radial artery since the dawn of medicine. With the constricting cuff applied above the elbow, the vibrations are rarely felt over the radial artery. Theodore C. Janeway[3] in 1901 recommended detecting the large pulsations of the fourth phase at the radial artery to determine the diastolic blood pressure level. Strasburger[4] (1904) emphasized the sudden diminution in amplitude of radial pulsation, as the cuff was blown up when the diastolic pressure level was just passed. After Korotkow[5] introduced the auscultatory method in 1905 its use became almost universal, and interest in measuring diastolic pressure by any other method diminished very much. However, Ehret[6] (1909) described as a new method for measuring diastolic pressure palpation of the brachial artery in the cubital fossa and noting the sudden transition from strong to weak pulsations. Ehret emphasized the prominence of the fourth phase pulsations, using the German word *brutal* to describe their quality, and mentioned that they are accompanied by vibration of the tissues in the cubital fossa near the brachial artery. He did not allude to these vibrations in relation to the sounds observed by auscultation. Thus he made no attempt to separate the "pulsations" from the "vibrations", but used the sense of touch to distinguish between strong and weak pulsation. Vaquez[7] (1921), alluding to the "pulse vibrations" at the diastolic level mentioned by Strasburger (1904), states that Korotkow "completed these researches, when he noted that the vibrations can be heard as loud sounds." Thus the early studies of blood pressure moved from palpation to auscultation. The present generation is hardly aware of any other method but that of auscultation. The subject of this communication is a palpation technique based on knowledge of the sounds that are now indexes of systolic and diastolic blood pressure.

Of what practical significance is this palpation technique? It could have no claim to superiority over the usual auscultatory method. However, those with hearing impaired to such a degree that auscultation cannot be practised may use palpation to measure the diastolic as well as the systolic pressure. And those who should find themselves in the circumstances which led me to use this method for the first time will be able to compensate for lack of a stethoscope. There are physicians who prefer the monoaural stethoscope which does not lend itself well to auscultation in measuring blood pressure; they may find this palpation technique of determining diastolic pressure better than estimating it from the character of manometric oscillations or changes in volume of the radial pulse. Finally, as the fourth phase is often more sharply defined by this palpation technique than by auscultation it may prove useful in checking the observations made with the usual auscultatory method.

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HOW TO GET INTO TROUBLE WITH FRACTURES

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"WHEN you first start out to practice you will probably sit with your feet on the desk for many a day waiting for patients to come to the door. As you look out the window, you may see a man washing windows across the street. The ladder slips, he falls to the pavement, his leg is broken. You rush down the stairs, out of the door, and run as fast as you can—in the opposite direction." The late Dr. Gideon Silverthorne gave graphic advice in his lectures on medical jurisprudence, but never any that was truer than the above quotation which is taken from his notes. A doctor can get into more trouble in less time with fractures than with any other type of work. Sometimes such needless tragedies are encountered that one wonders despairingly whether the doctor has tried to build up trouble both for the patient and himself.

To steer a tranquil course amid the hazards that surround the treatment of a fracture requires constant alertness and attention, as well as skill and knowledge. There are five outstanding pitfalls that are so easy to slip into that they may be picked out for discussion.

The family physician or surgical specialist can get into trouble with equal celerity, as described henceforth.

1. By Developing a Single-track Mind

The doctor who can see and think of only one thing at a time is sure to miss other associated injuries. Sometimes a fracture is obvious. It catches the surgeon's attention, and, in his interest, all other thoughts are crowded from his mind. He may proceed to treat a fractured pelvis efficiently, only to discover next day, to his surprise, that the patient also has a ruptured bladder. In fact, we have heard of an eminent specialist who treated a fractured ulna not merely for days, but for weeks and months, seeing his patient many times, only to learn later that the patient also had a dislocated head of the radius on the same side. The second lesion, just six inches away, was missed because the expert "never thought of it".

Or, one might imagine a surgeon treating an unconscious child for fractured skull following a serious motor accident. Days later, to the great joy of the parents, and to the satisfaction of the surgeon, the child regains consciousness, but complains of pain in the chest where fractured ribs have been missed. Strangely enough, the gratitude of the parents for its recovery from the fractured skull is so transient that it is soon replaced by annoyance over the neglected ribs. If, therefore, one prefers to avoid trouble, one must remember always that he is treating a patient, not merely a fracture.

2. By Neglecting to Make X-ray Films

In the olden days many a fracture was diagnosed, reduced, and treated without the benefit of x-ray. Today, however, the wise doctor uses x-ray before and, more particularly, after reducing fractures. Valuable as the x-ray is in diagnosis, it is even more important for recheck, both as to position and union. Today the public is x-ray-minded, and, knowing that the shadows of the bones can be seen, it will not tolerate lack of information. Moreover, the legal profession is so impressed with the x-ray that neglect to have a fracture x-rayed is in itself almost ground for a mal-practice suit.

In some injuries fractures are sufficiently obvious that an x-ray may be unnecessary as far as diagnosis is concerned. But, in any injury of such severity that fracture *might* exist, and, if none be obvious, the x-ray must be used. A new intern once refused to x-ray a foot on which an armature had dropped. He had examined it carefully, and, as he said, could demonstrate no fracture. The next day the staff surgeon saw the patient and ordered an x-ray, which revealed four broken bones in the foot.

3. By Never Asking for a Consultant

The doctor who insists on playing a lone hand deprives his patient of the benefit of a second head, and himself of the joy and comfort of human support and companionship in

tribulation. Everyone gets into difficulties sooner or later. The doctor who has never lost a case has either seen very few, or is refusing to try to help his patient if there seems any chance of failure. Most consultants have seen enough of practice and enough of life to be very understanding people. Their job is to share the responsibility of the family doctor and to help him get the best possible result for his patient.

Fractures progress so slowly that patient and relatives often become discontented. Further, the transition from slow union into delayed, or even non-union, is so gradual that the attending physician is sometimes a little slow to realize that this complication has arisen. Why isn't the bone knitting? If something different had been done at the start would it have united? The quiet assurance of a consultant that this is a well known, though rare, complication, goes far to maintain the patient's confidence and smooth the way for further operative procedures, if such become necessary.

Occasionally one meets a young practitioner who is none too sure of himself and who feels that his prestige suffers when he asks for help. Strange as it may seem to him, when a consultant is called the reaction of the patient is the exact opposite to that which he anticipated. From then on he is regarded not only as a doctor but as a trusted friend. His patients are pleased and proud that he is interested in their welfare and the correct progress of their condition.

4. By Treating all Fractures, No Matter how Difficult

The American College of Surgeons published recently a small booklet on fractures for the guidance of general practitioners and surgeons. Special reference was made to first aid, having in mind automobile accidents, particularly. In several cases it is recommended without qualification that the case be turned over to a specialist. The treatment of some types of fractures is so technical and so difficult that it is only fair to the patient that he be treated by those equipped with the necessary mechanical devices and experience. Further, the final results are in some cases so disappointing that the average doctor would be well advised, from a purely selfish point of view, to pass them on. For example, telescoping fracture of the os calcis is one such problem. There are many types of fracture of the os calcis. It may be true that some of them yield a good result by fairly conservative means of treatment. Some require open operation, some skeletal traction, others may be pounded. The judgment required in deciding the correct treatment taxes the expert to the limit, and the technical steps in carrying out the treatment are complicated and difficult. Finally, the result after three to six weeks' treatment is often so bad that both patient and doctor are discouraged with the whole business. Only recently one man who sees many such fractures made the general statement that "most fractured os calces never work again".

Many fractures around the ankle, elbow, both bones of the forearm, broken backs, or necks are other illustrations of fractures which may easily cause a doctor weeks of worry, with disappointing result; and bring a pitifully small fee.

5. By Keeping No Records

The Canadian Medical Protective Association strongly advises that detailed records and progress notes be kept on all fractures. The doctor who keeps no record of his findings at the time of fracture, progress notes, or record of complications, can be sure of getting into trouble sooner or later. From the patient's point of view, a careful complete record assures him of a detailed examination. Further, the doctor who is aware of complications is more likely to treat them promptly and forestall unnecessary tragedy. For instance, in a case of supra-condylar fracture of the humerus the doctor who actually writes down whether a radial pulse can be felt or not is likely to recognize its absence and do something about it. From the doctor's point of view, it is obviously desirable to have a record in writing, before an anæsthetic is administered, or any manipulation carried out, in cases where pulse or sensation is impaired. Continuous progress notes also make sure of spotting a slip in position or angulation as soon as it occurs, at which time it can still be corrected easily.

One recalls a doctor some years ago who reduced a fracture around the elbow, and applied a circular plaster. The patient, who lived far out in the country, was instructed to return in 6 weeks for removal of the cast. He had considerable pain the first night but a sedative had been provided in anticipation of some discom-

fort. After a short time the cast became a bit "smelly" but, then, any arm or leg done up without a bath for six weeks in the summer time may become slightly unpleasant. When the patient returned at the end of the allotted time one glance, as he unwrapped the fingers, told the horrified doctor that they were gangrenous. Daily supervision and progress notes would have revealed the need to split the cast and loosen the bandages.

We must continue to accept, with alacrity, the responsibility for the treatment of fractures. The treatment will, however, be more likely to result in the best possible result for the patient if the doctor regards all fractures with wholesome respect. In addition, the peace of mind which comes from the knowledge of work well done will be his only if the physician anticipates difficulties before they occur and "builds a fence around all troubles".

One can offer no better advice to the doctor going out into the community to earn his living than the admonition with which the disciples were sent out into the world to preach the gospel,—"Be ye, therefore, wise as serpents and harmless as doves".

THE CHEMOTHERAPY OF ACQUIRED SYPHILIS*

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CHEMOTHERAPY, broadly speaking, is the treatment of parasitic diseases with chemical agents. Many chemical agents are of little or no value in so far as disease is concerned and modern chemotherapy means the prevention or treatment of disease by chemical destruction or inhibition of the parasitic causes without serious toxic effects. The science of chemotherapy as defined by Ehrlich "treats of the action and mechanism of the effects of chemical substances upon cells and especially of drugs upon disease producing organisms". In plain language the science of chemotherapy constitutes a search for specific remedies in the treatment of diseases caused by parasites. The parasites may be on the skin or they may be in the blood or in an internal organ. The important quality in a chemotherapeutic agent is that the parasites shall be killed or so affected that the body defences can destroy them by doses that are not injurious to the body cells. The destruction of gonococci in the urethra by sulfanilamide, of spirochætes in the blood stream by arsphenamine and of sarcoptes scabiei in the skin by sulphur constitutes three typical examples of chemotherapy.

Ehrlich, who fathered modern chemotherapy, gave us the dictum that parasites can only be destroyed by those materials for which they have an affinity and which are capable of being fixed or anchored by the parasites. He designated the combining affinity as parasitotropy but he also recognized that they had a combining affinity for the cells of the body and this he termed organotropy. The latter is related to the pharmacological and toxicological action of drugs. Only those substances in which parasitotropy and organotropy stand in proper proportions are useful as medicaments. Some chemical compounds, notably many of the dyes, whilst highly parasitotropic, are not parasiticidal and it is only those substances in which there is a close relationship between parasitotropism and parasiticidal activity that find a place in our therapeutic armamentarium, although of course compounds may prove therapeutically effective in an entirely different way and without involving the question of parasitotropism at all.

The ideal chemotherapeutic substance has a minimum of organotropism and a maximum of parasitotropism. To express this relationship Ehrlich coined the phrase "chemotherapeutic index". The chemotherapeutic index of a compound is determined by administering it in graduated doses to animals infected with the chosen parasite and the maximum tolerated dose and the minimum curative dose per kilogram of weight are ascertained and expressed as an equation thus:

$$\frac{\text{Maximal tolerated dose per kilogram}}{\text{Minimal curative dose per kilogram}} = \text{Chemotherapeutic index}$$

For example the minimal curative dose of neoarsphenamine for rabbits is about 0.015 grams per kilogram and the maximum tolerated dose is about 0.350 grams per kilogram of weight. The

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* Read at the Seventieth Annual Meeting of the Canadian Medical Association, Section of Dermatology, Montreal, June 22, 1939.

chemotherapeutic index therefore is $\frac{0.350}{0.015} = 23$. In other words the animal can tolerate a dose of neo-arsphenamine 23 times greater than that required to kill his spirochætes.

Ehrlich has shown that the valence of organic arsenicals bears a relationship to parasitotropism and organotropism, valence being the energy capacity of an element expressed in numerical terms, hydrogen being taken as the unit 1. Where an atom of an element requires only 1 hydrogen to form a compound the element is univalent. Arsenic is pentavalent and in this condition all its energy is bound. In its trivalent condition it is unsaturated and capable of further reactivity. This explains why the arsphenamines which are trivalent compounds are more spirochæticidal than tryparsamide which is pentavalent.

The mechanism of the spirochæticidal activity of the organic arsenic compounds is not clear. Arsphenamine is much more spirochæticidal in the blood stream than in the test tube and it may be that new compounds are formed in the body by union with some cellular constituents. Ehrlich showed that the oxidation of arsphenamine with the formation of arsenoxide markedly increased spirochæticidal activity, although at the same time it increased toxicity in rabbits about ten times. He believed that the same process occurred in man and that these oxidation products constituted the active spirochæticidal substances. This opinion is borne out by the therapeutic success attending the use of mapharsen, which is really arsenoxide very slightly modified by an HCl radical. The toxicity of mapharsen is not obvious because it is given in doses of only one-tenth that of neo-arsphenamine. The curative activity of arsenical compounds is also due in part to the stimulation of antibody production by the release of antigenic substances from the killed spirochætes.

Little is known of the mechanism of spirochæticidal activity of bismuth compounds. They are capable of destroying the motility of the Spirochæta pallida *in vitro* and bring about its complete destruction *in vivo*. To be rapidly effective bismuth should be given often enough to maintain a therapeutic blood level. An idea of this level may be obtained by estimating the urinary excretion of bismuth by the rapid clinical method of Hanzlik.[1] A daily urinary excretion of from 1.5 to 5 mg. of bismuth is regarded as indicating a satisfactory blood level. To maintain this level water-soluble salts such as thiobismol, or propylene glycol-soluble salts, such as iodobismitol, should be given every two to three days, oil-soluble salts should be given every five days, and oily suspensions, every seven days. Bismuth metal is absorbed very slowly and when used for its synergistic action with an arsphenamine need be given only every fourteen days.

Mercury seems to accumulate in syphilitic tissue. It differs from the arsphenamines and bismuth in that its toxicity for spirochætes is high in the test tube and low in the blood stream. Experience of more than 400 years of its use leaves no doubt that it possesses curative activity in human syphilis. Sidlick and Strauss,[2] however, showed that mercury by inunction used alone in the Wassermann-negative stage of primary syphilis was incapable of preventing the secondary manifestations of the disease.

The iodides on the other hand have usually been regarded as having no spirochæticidal activity but act by aiding the removal of inflammatory tissue by a process of proteolysis. There is evidence, however, to show that sodium iodide given intravenously in large doses probably aids in the destruction of the *Spirochæta pallida*. Burke[3] advises the use of iodine in doses of not less than 90 grains per day in the early stages in order to prevent excessive fibrosis. No amount of iodine therapy can cause the disappearance of a scar; it is during the months preceding scar formation that iodine is indispensable. If the fibrosis is thought to be protective, as in aortic aneurysm, iodine should be withheld. When the iodides are used in early syphilis arsphenamine should be given simultaneously to destroy any spirochætes liberated as a result of the re-absorption of partially fibrosed tissue.

COMBINATION THERAPY

The use of two or more chemotherapeutic substances at the same time has been customary for some years on the assumption that the spirochæticidal effects should equal a summation of the curative activities of each, but it is now known that the effect is greater than this. Mercury, for example, enhances the activity of arsphenamine so that the result is a greater degree of spirochæticidal activity than a summation of the effects of the respective drugs alone. Reliance should not be placed on one

drug in preference to another except in late syphilis of aged persons when treatment may be restricted to the iodides and mercury. It is not a question of arsphenamine versus bismuth or mercury; the best results are obtained by a judicious combination. Cannon and Robertson[4] studied the effects of mercury and bismuth in 379 patients in order to determine which was the more effective adjuvant to arsphenamine and found little difference. Bismuth was more prompt in promoting the healing of primary lesions whilst mercury produced a more rapid effect in secondary lesions and it was less often followed by relapse. Both should be used but neither replaces the arsphenamines. The relative chemotherapeutic efficiency of the four drugs of proved value in the treatment of syphilis is usually expressed by assigning to arsphenamine the value 10, and to the others, in descending order of merit, bismuth 6, mercury 3, and the iodides 1.

Antibodies produced naturally by the host are never sufficient to bring about the destruction of all spirochætes and spontaneous cure must be rare. The cure of syphilis is only possible with drugs which are spirochæticidal in non-toxic doses and which may be administered in such a way that they come in contact with the spirochætes. The conditions for this are best in the early weeks of the disease before the organisms are walled off by fibrosis.

In the practical application of chemotherapy the patient must not be left out of the picture. The organotropic effects must be borne in mind. Large doses of the arsphenamines depress the bone marrow and other erythroblastic tissues and may cause serious blood dyscrasias, while it has been long known that small doses stimulate these tissues and are useful in the treatment of some forms of anæmia. On the other hand small doses are apt to stimulate arsenic fastness in the spirochætes and are not curative. A middle course is indicated. During the past fifteen years the dosage in our Alberta clinics has been 0.45 grams of neo-arsphenamine for the average adult, with 0.6 grams being given to the heavier patients at each treatment. With this moderate dosage arsphenamine reactions are minimized and serious ones practically eliminated. If this is so with regard to organotropic effects, which are immediately obvious, it is probably also true of more remote effects such as a reduced resistance of the body tissues to tuberculosis, cancer and other diseases. Experience in our Edmonton clinic with neurosyphilis is suggestive. In a series of 1,200 previously untreated patients in various stages of the disease but excluding patients with symptomatic neurosyphilis, the cerebrospinal fluid at the end of nine months' moderate dosage treatment was positive in some degree in 228 patients (19 per cent). It is significant that of more than 200 of these asymptomatic neurosyphilitics who were treated with malaria pyrexia therapy there has not been a single death from malaria, and furthermore not one of these patients has subsequently developed symptomatic neurosyphilis. Massive dosage, however, may prove to be the method of choice in sero-negative primary syphilis. The intravenous drip method of massive dosage introduced by Chargin, Leifer and Hyman[5] is interesting. They were able to give 4 grams of arsphenamine in five days, maintaining a constant therapeutic blood level during the entire period. An adequate total amount of treatment is of the utmost importance in the prevention of relapse. This has been proved by the well-known investigations of the American Co-operative Clinical Group. They showed that with only four injections 64 per cent of the patients relapsed, while with forty injections only 1.2 per cent relapsed.

THE TREATMENT OF SYPHILIS

Though it may seem illogical and unscientific to apply a routine method of treatment to a mass of patients it has been amply demonstrated that such a procedure is of definite value in syphilis. It was formerly the universal practice to administer anti-syphilitic remedies in courses with rest periods interposed. Modifications of this interrupted or staggered treatment are still used in Europe but in the light of experience accumulated during the past twenty years American practice has veered to the method of continuous treatment, the courses being given without any rest periods. The plan of treatment which is about to be described has been in continuous use in Alberta clinics since 1924. It is proposed to detail the treatment for sero-negative primary syphilis and later indicate modifications of this scheme for other stages of the disease.

The treatment of sero-negative primary syphilis.—The sero-negative primary period before

the blood serological tests have become positive has been termed by Pusey "the golden opportunity in the treatment of early syphilis". Adequately treated, a cure in this stage is all but certain. The diagnosis will have been established by darkfield examination. If the chancre has been present for less than two weeks one assumes the blood to be sero-negative but if it later proves to be sero-positive no harm will have been done by the more intensive treatment about to be described. In this stage every hour is important and the instant the diagnosis is made the patient is given an intravenous injection of neo-arsphenamine and an intramuscular injection of bismuth. The dose of neo-arsphenamine will vary somewhat with the weight of the patient. For adult patients under 175 pounds we use 0.45 grams and for heavier patients 0.6 grams. The neo-arsphenamine is repeated on the second day and again on the third day and then every five to seven days until a total of ten has been given. At the same time the bismuth is given every fourteen days and at the conclusion of the course of ten intravenous injections of neo-arsphenamine the bismuth is increased to one every two to seven days, depending on the preparation, until fifteen such injections have been administered including those given with the neo-arsphenamine. This concludes the first course of treatment.

The second course is started at once without any rest period and is an exact duplicate of the first, except that the intensive treatment given on the first three days is omitted, the neo-arsphenamine being given at five to seven day intervals throughout. At the conclusion of the second course the third course is at once started and it is an exact duplicate of the second. The patient will now have had a total of 30 intravenous injections of neo-arsphenamine and 45 intramuscular injections of bismuth administered during a period of eleven months. The spinal fluid is examined between the ninth and eleventh month. A specimen of blood is taken for the Wassermann and van den Bergh tests at the time of every intravenous injection in sero-negative primary syphilis. If all 30 Wassermann tests have been negative and the cerebrospinal fluid is negative the patient is regarded as cured. Despite this however, he is kept under observation for a further period of at least two years, the blood Wassermann test being performed every three months. Our Provincial routine does not call for mercury or iodine in early syphilis but in our Edmonton clinic we are now testing the value of large doses of potassium iodide as an adjuvant to neo-arsphenamine and bismuth. Mercury is reserved for use during the harvest season or other occasions when it may be necessary to interrupt clinic treatment for a few weeks. We prefer Hutchinson's pill containing one grain each of Dover's powder and of grey powder. Mapharsen is substituted for neo-arsphenamine if the patient does not tolerate the latter.

The treatment of sero-positive primary and secondary syphilis. — The treatment of early syphilis after the blood Wassermann test has become positive is exactly the same as for sero-negative primary syphilis except that the intensive treatment during the first three days is omitted. A total of 30 intravenous injections of neo-arsphenamine and 45 intramuscular injections of bismuth is to be regarded as the minimum treatment and more than this total is often necessary. A specimen of blood is taken for the Wassermann and van den Bergh tests at every second intravenous injection and the cerebrospinal fluid is examined between the ninth and eleventh month. Even though at the end of treatment the patient is free of symptoms and the blood and cerebrospinal fluid are negative he is kept under observation indefinitely, reporting for examination and blood test every three months during the first two years and thereafter once a year.

The treatment of latent and late syphilis.— Caution must be exercised at the outset of treatment if the disease has existed for an indefinite period. There may be undisclosed involvement of the viscera or of the blood vessels and a Herxheimer reaction must be avoided. This reaction occurs about eight hours after the first injection of an arsenical and is a result of the destruction of large numbers of spirochætes and the absorption of their endotoxins or proteins. It occurs in the syphilitic lesion or lesions and is characterized by œdema accompanied by a greatly increased infiltration of plasma cells and lymphocytes, sufficient sometimes to double the size of the lesion. It is a common observation in the chancre, and the regional lymph nodes are likewise affected. In new positive primary syphilis it may cause a profuse secondary rash. A similar reaction may occur in syphilitic tissue anywhere in the

body and herein lies its importance. In syphilitic aortitis with coronary involvement the œdema may occlude the coronaries causing a fatal issue. In gumma of the larynx it may seriously interfere with breathing, and in aneurysm rupture may occur. In the nervous system owing to the small amount of the drug reaching the lesions the reaction may be delayed. It is obvious that the symptoms depend entirely upon the site of the syphilitic lesion. It is unimportant in early syphilis except as a confirmatory diagnostic sign, but in late syphilis it may be disastrous. Fortunately it can be minimized by producing at the outset of treatment a more gradual destruction of spirochætes, using mercury or small doses of bismuth. Such preliminary treatment should always be used in late syphilis. A satisfactory procedure is to give a six weeks' course of an insoluble bismuth preparation such as bismuth metal, the intramuscular injection being given every five days, using 0.05 grams for the first two doses and 0.1 grams at each of the succeeding treatments. Neo-arsphenamine may then be given in the same way as for sero-positive early syphilis. For many patients, however, this will have to be modified. A patient in his sixties for example, who is symptom-free and whose only evidence of syphilis is his positive serological test, should as a rule not be given arsphenamine at all. Treatment should be limited to bismuth, mercury and potassium iodide. It is here that the clinical judgment of the physician must be exercised to the utmost. Standardized treatment is not applicable to the elderly or to the debilitated patient.

Neurosyphilis. — In both asymptomatic and symptomatic neurosyphilis malaria pyrexia therapy should be used unless there are contra-indications. The course should consist of ten chills with a pyrexia of not less than 105°. This does not replace other forms of treatment and following its use several courses of arsphenamine and bismuth are usually required. The pentavalent arsenical, tryparsamide, is of proved efficacy in syphilis of the nervous system and is now universally used in the post-malarial therapy of neurosyphilis. The bismuth preparation selected should be one such as iodobismitol or thiobismol with high cerebrospinal fluid penetrating qualities. The amount of post-malarial treatment required varies within wide limits in different patients.

In conclusion one should stress the importance of encouraging the patient by assuring him that the present day treatment of syphilis, thoroughly carried out, yields a very high percentage of cures and if treatment has been undertaken early a cure is almost certain.

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THE TREATMENT OF SCHIZOPHRENIA BY HYPOGLYCÆMIA*

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BEFORE any mention is made of treatment, it is usually considered necessary to attempt some description of the disease we are treating. This is particularly difficult in the case of schizophrenia. Briefly, schizophrenics are people who seem instinctively to prefer the society of their own thoughts. The word *instinctively* should be emphasized. They do not primarily retreat from society because of shyness or self-consciousness, although it must be admitted that in many cases these factors complicate the picture, but they retreat because they seem to have a fundamental disinclination or disability to enter into the life of the world around them. Thus, even before any frank symptoms of insanity appear, such people often seem cold, unsociable and queer. As the condition advances we find them living more and more in their own world of imagination, ever developing stranger and more absurd fantasies and delusions, until finally, but not in many cases until after the lapse of years, these patients build up for themselves an unreal world in

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which, all too frequently, they sojourn for the rest of their natural lives.

The variation in symptoms which such a process will present to the onlooker is extraordinary. First, the initial impulse to withdraw into their own thoughts may and does, vary widely. In other words, some people have only a slightly closed or schizoid tendency, while in others this impulse is great. Secondly, the degree of intellect, the amount of education, the early training, the effect of environment with its varying stresses and strains, all influence the type of delusion and the reaction of the patient. Thirdly, we have to consider the stage in the process in which we find the patient. Some still have fair contact with the world; others are almost wholly wrapped in their own thoughts. In some, the fantasies have become pleasing; in others, the delusions are still distressing. One has to observe large numbers of patients over a period of years, to appreciate the variation in symptoms which the interaction of all these factors can cause.

The only constant symptom and the only trustworthy diagnostic sign is the tendency to lose interest in the outside world and to compensate by building an unreal one. The old name was dementia præcox, and a still earlier one, chronic dementia. The fashionable one is at present, schizophrenia, from the fact that these patients are supposed to suffer a splitting of their personalities. The longer I live with these people, the greater are my doubts as to the aptness of either term, but this paper is not the place to discuss the suitability of the name.

I think I voice the feelings of the vast majority of the men in mental work when I say that we have absolutely no idea as to the true cause of schizophrenia. The neurologist takes it for granted that something must be wrong with the nervous system. The Freudians talk about fixation in the narcissistic stage. Others stress the importance of environment, while still others are hoping to find some metabolic, endocrine or, more broadly speaking, biochemical dysphasia. All we know at the present time is that there are thousands of people who have either an hereditary or congenital tendency to retreat from this often hard and stern world and to wrap themselves up in fantasy to such an extent that they are not only unable to perform efficient work, but often become a menace to society. As a result the community must shut them up and take care of them for the rest of their lives.

It follows from this that any treatment which we can at this time apply must be entirely empirical. I can think of scores of patients who have been taken to every neurological centre on the continent, who have spent years with psychoanalysts, who have been readjusted by patient and painstaking psychiatrists; the end-result has all too often been the same, final commitment for life to an institution. Once in the asylum, we use our vocational and habit-forming classes more because we feel that we must do something than with any hope of doing actual good. The unfortunate patients are subjected to all conceivable remedies, administered by all conceivable routes, much to the profit of the drug companies but of small avail otherwise.

The above is, I think, a fair picture of the state of things when about 1931 Sakel, of Vienna, began giving drug addicts large doses of insulin to control withdrawal symptoms. In some instances he gave enough insulin to produce coma and convulsions. We will not mention here the effect of insulin on the withdrawal symptoms, but Sakel made the observations that patients so treated showed a distinct alteration in their temperament. Many who had been of a rather schizoid type, inclined to be closed in and strange in their reactions to other people, appeared, as it were, to wake up. They took more interest in their environment, they entered more fully into the life around them, in other words, they became less schizoid. He immediately realized the value of this result and began to treat schizophrenics with large amounts of insulin. His procedure and his results have been so widely published that I will make only brief mention of them here.

Sakel started his patients on ten or twenty units of insulin, increasing the dose each day until a coma dose was reached. This coma dose was given at about seven o'clock in the morning and varied from as low as 30 to as high as 300 units. After the patient had been in coma a certain length of time, anywhere from thirty minutes to two hours, enough sugar water was given through a nasal tube to counteract the insulin. The patient woke up and was given his dinner. The process was repeated the next morning, and kept up until he was considered well or until enough treatments had been given

to satisfy Sakel that that particular patient would not respond. Some 60 or 70 per cent of remissions in what were otherwise considered hopeless cases were obtained.

We started insulin treatments in the Provincial Hospital, New Brunswick, on October 22, 1936. By January we had established a seventeen-bed ward, staffed with a doctor, a bilingual nurse, a male orderly, and a female orderly. Subject to holidays and sickness, we have retained the same personnel ever since. Somewhat to my surprise, none of the staff have tired of the unvarying character of the work, but are more enthusiastic now than when they started. By May 31, 1939, we had completed treatment on a total of 118 cases of schizophrenia, and have 15 under treatment at the present moment. Of the 118 patients 85 were sent home; 12 cases relapsed, 6 of which cleared up under subsequent treatment and are now home, making a total of 79 now out of the hospital. Of the 39 left about 12 are improved and working in the hospital; the remainder, for all practical purposes, are unimproved. Ten of the 79 have been out two years or more. This number will now rapidly increase. About 10 of those presently under treatment will almost certainly make an adequate recovery.

We feel that our form of report is much better than that commonly used, namely, full remission, social remission, improvement, etc. We have found by experience that we at least are not capable of distinguishing between full remissions and social remissions, as some whom we sent home as full remissions relapsed and are now in the hospital practically unimproved, while others whom we sent home as social remissions have done excellently, and to all appearances are now fully restored.

Our routine is about the same as in all other clinics, and our laboratory results have been, in the main, the same as reported by the other centres. I wish, however, to make the following observations, which as far as I know, are peculiar to our series. Very early in our work, we became imbued with the conviction that *long continued restful treatment* was much to be desired. We were confronted with the fact that in most of our patients the disease was of long standing; in many the time since the beginning of symptoms had to be counted in years, not months, and it did not seem to be in accordance with good medical principles to expect, as it were, to "jolt" our patients out of such a chronic condition in a week or a month. If such long continued treatment were to be given, we had to secure the co-operation of the patient and also avoid the probable, though at that time unknown, dangers which such a course of treatment might entail. To aid us in carrying out this aim, we have, during the last eighteen months put our patients on a standard diet, *viz.*, 200 grams of carbohydrate, 66 grams of protein, and 45 grams of fat. This, with the sugar used in terminating the coma, seems ample for the patients; at least they have averaged 15 pounds gain in weight during the treatment.

The standard diet has apparently accomplished several things. First, it has reduced the amount of insulin used by approximately 30 per cent. Before it was used we averaged about 90 units of insulin per patient, per coma, with a high in one case of 270 units. For the last year we have only averaged about 60 units per patient, per coma, with a high of 150 units. In one case perfectly satisfactory comas were obtained with an average dosage of only 8 units.

Once we have arrived at the approximate coma dose for any particular patient, the standard diet helps to keep this dose fairly constant. When the diet is uncontrolled there is a constantly varying glycogen reserve, and consequently each morning the doctor has to do more or less guess work as to the amount of insulin to use. Mistakes in dosage were inevitable. The patient might not go into coma at all or else might go so deeply that a convulsion would take place. For the same reason we are now able to bring all the patients out of their comas with a standard amount of sugar, irrespective of the amount of insulin they have had, and again, for the same reason, the possibility of a secondary coma later in the day is rendered very unlikely; in fact, we have not had a secondary coma during the last year.

Termination is now always by the intravenous route, namely, 30 c.c. of 33 1/3 per cent dextrose, plus one cup of 75 per cent corn syrup and water, by mouth. The patients are then given their standard meal.

It should be particularly noted that this careful procedure enables us to gain the co-operation of practically all of our patients. They are not afraid of the treatment because it does not upset them in any way. Nearly all wake up quietly after each coma, and state that they feel very

much rested and are anxious to have more. We find that this attitude of mind has a great deal to do with what success we have had. Patients who because of gastric upsets, convulsions, etc., are afraid and consequently non-co-operative, do not respond as readily as patients who are co-operating fully.

We are satisfied that the intravenous method of termination is far superior to the stomach tube. We feel that it gives us more control of the patients. By its use we can effectively manage the course of events during coma, and bring practically 100 per cent of our patients out of their comas quietly, in a composed and often rational state of mind. Almost invariably they speak of being "rested". This, we consider to be valuable, even if the patient relapses within a few minutes into his delusions. Many speak of their "voices" becoming "fainter and fainter" or more and more "distant" with each successive treatment.

Certain clinics are now reporting that, due to convulsions, some patients suffer fractures of the vertebræ and femur, others are reporting extensive cerebral damage, but due, I think, entirely to our adherence to the above principles we have had no untoward accidents.

Only one death occurred and that in a young man of eighteen years of age who had been treated less than a week. The cause of death was a subacute appendicitis with a post-operative adynamic ileus. This patient entered the hospital with a clinical record of three previous attacks of appendicitis which had subsided without operation.

We think that long-continued treatment is essential. Even after the patient apparently recovers, treatment should be continued for weeks. Also, once we decide to institute treatment we do not allow ourselves to become easily discouraged. We have given as many as 140 treatments with no signs of improvement, but on persisting beyond this point, we have secured satisfactory results.

Owing to the fact that the relatives are usually reluctant to send mental cases to the hospital early in their psychoses none of our cases could be classified as early. Not more than five patients came in with a history of less than three months' duration and the majority ranged from six months to a year. One patient was treated seven years after her initial psychoses. She has now been home over a year. I have seen her recently, and if my judgment is worth anything, she is perfectly well. Another with over three years' history has been home for over a year. We have two or three more with psychoses of from two to five years' duration who responded to treatment and are now out. We fully expect these long-standing cases to relapse, but it will be interesting to repeat treatments on them when necessary during the next five or six years. One has already been treated three times. That is to say it seems possible to re-establish sanity by a course of treatment, but the road to fantasy is in long standing cases, so well known and so easy to take that the patients slip back very easily into their delusions. As one of them expressed it to me, "If you had been thinking this easy way for as long a time as I have, doctor, you would find it almost impossible to keep away from it whenever you were worried". In other words, the problem here seems to be to break the well established habit.

One other fact must also be emphasized. Our ward team is not only responsible for treating these patients in the morning, they also direct their activities during the rest of the day. In other words, psychotherapy, vocational therapy, and counsel by the doctor are extremely necessary to the patient, who with great effort is striving to again find a place in the, to him, strange world of reality.

If we have any standard prognosis, it is not so much the length of time that the patient has been psychotic as it is whether or not he has attained satisfaction in his unreal world. If he is still dissatisfied, still unsuccessful in attaining a satisfactory world of fantasy and delusions, we feel that he is worth treating. If, however, he has built up a world with which he is perfectly contented we have noticed that treatment has little effect, even although the psychoses may be of relatively recent origin. We think that this is the real reason behind the common statement that the paranoid types do better under insulin than do other types. The paranoid, for the most part, is still unsatisfied, still striving to attain a satisfactory world of fantasy. In the old days we expressed the same idea by stating that the paranoid "degenerated slowly".

I feel strongly that the figures I have given must not be taken too seriously. We have no surety that all were schizophrenics. As indicated

before, we have no certain method of diagnosing dementia præcox. Diagnosis depends entirely upon the experience of the diagnostician; we have no laboratory or x-ray checks. For the same reason even the provision of an equal number of controls would not help us very much. But I do want to say this, speaking as a man who has for a good many years lived with fairly large numbers of schizophrenics, I am quite convinced in my own mind that a goodly proportion of those who apparently recovered and went home would still be in the hospital had they not received treatment.

There is, however, another and I think more reliable yardstick. We had our ward established and, to use an industrial term, in active production by February, 1937. Our population was at that time 1,050. Our average increase for the five years before that date had been about thirty patients per year. In March, 1939, our population was still only 1,050, and during the intervening two years, we had no decrease in the admitting rate and no increase in the death rate. This, to me, is a striking fact, and I feel strongly inclined to attribute part of it at least, to the existence in the hospital of a hypoglycæmic ward.

I suppose this paper should not close without an attempt to supply some reason for the results obtained. My own view is that until we know more about the fundamental basis on which dementia præcox arises all such speculations are entirely useless. Most of the hypotheses postulate some change in the brain. Sakel suggested the blocking of the abnormal pathways over which the impulses run, thus allowing the patient time to resume the old normal pathways which had been disused. Others speak of a metabolic effect on the brain, such as, *e.g.*, a lowered oxygen utilization. I must confess that the longer I live with schizophrenics, the less does a purely neurological explanation of the picture they present appeal to me as a primary cause. There is a reasonableness in their unreasonableness, a purposefulness in their retreat from reality, a lack of true dementia that is very different from the deterioration and dementia that sooner or later is seen in all progressive organic lesions. The schizophrenic appears to have a good intellect, but he is instinctively forced to use this good intellect wrongly, much in the same way that we all tend to believe what we want to believe. A mother, for example, no matter how intellectually capable she may be, will often at the behest of her maternal instincts absolutely refuse to believe that her boy can be a criminal, and in the face of absolute facts to the contrary she will build up a belief in his innocence that is just as much of a delusion as anything we may see in an insane ward. The best of tools will if used wrongly turn out absurd work. The best of intellects will if surrendered to the guidance of abnormal instincts manufacture the most absurd delusions. I am, at the present in possession of a well written review of the European situation. One would hardly imagine that it was written by a schizophrenic who has been fifty-two years in an asylum and believes himself to be King of the world.

If I were forced to theorize, I would start from the fact that, clinically, the syndrome known as schizophrenia is a disturbance of the fundamental instincts and emotions, and if we admit McDougall's statement that our emotions are simply the reflection of our life instincts in consciousness, and if we further remember that in the course of evolution the primitive life-instincts are manifest long before there is any sign of a nervous system, in the amœba for instance, we can see the truth of the statement which Gedelius makes, "It is proper to say that we feel with every cell in our body", or, more plainly still, "The entire body is the organ of the mind". This conception of the true seat of our emotions is not new; it is very old. In the Bible we read that Abraham's "bowels", not his head, "yearned over his son Isaac".

From the above, it is at least conceivable that the cause of schizophrenia may be due to disturbances in our fundamental chemical mechanism, and it is, I think, equally reasonable to assume that one cannot reach into such a complex structure as the body and pull out the brick marked "sugar", without causing a far-reaching disturbance. In saying this I am not unmindful of the close connection between the autonomic system, the endocrine system, and our brain, particularly the hypothalmus, and I also do not disregard the fact that some portion of the brain must be charged with the duty of picturing our instincts as emotions in consciousness.

There is, however, another view that both Dr. Hatfield and Dr. McDonald have strongly put forward. It is that we may, by means of hypo-

glycæmia, be applying to our patient the greatest of therapeutic agents, *viz.*, rest. During our thirty-three months' experience it has been strongly impressed upon us that where they are benefited our patients always speak of being "rested". They do not have the dreams they used to have. Their half hour of coma refreshes them more than a night's sleep. We are so greatly impressed by this that our whole trend is towards restful treatment. We avoid convulsions, we strive to get co-operation and the replacement of fear by trust and confidence.

The existence of sub-conscious activity must be admitted. We all know that faced with worries and difficulties our sleep is not restful, even when we are able to force our problems enough below the surface of consciousness to secure it. We have had, further, several schizophrenics who, after they became well, told us that each new delusion arose while they were sleeping. For instance, one man told me that he well remembered the morning he awoke with the firm belief that he was the King of England. "It came to me while I was sleeping, Doctor" was his remark. Frankly, we have been wondering if an insulin coma does not abolish subconscious activity and turmoil, whether it does not invade the field wherein the patient is building up the unreal world in which he will henceforth live, wipe the slate clean, as it were, and give the patient a chance to write again reality upon it. It is quite possible that the metabolic effects which have been noted to exist in the brain during coma may only indicate that we are applying a glorified hypnotic.

Years ago, Bleuler used long-continued narcosis as a treatment for some mental states. I myself, some years ago, treated a small series of manics by keeping them under hypnotics for periods varying from one to three weeks. While the procedure is too difficult and painstaking for routine use, yet some dramatic results were obtained. Due to the above considerations, we have, during the last year, treated six typical manics by giving them insulin comas. Five of these had been in the hospital one or more times before. On their last previous visit they each had on an average spent 197 days in the institution. On their last visit, during which hypoglycæmia was induced, their average time of residence was only 67 days. The remaining one had no previous visit to serve as a check, but under treatment he only spent a total of 54 days in residence. I can vouch for the fact that this period was much shorter than manics of his type usually take before they get over an attack. I am aware that even six swallows do not make a summer, but we are enough impressed by these results to continue this secondary series for some time longer.

The hypothesis of subconscious rest can, I feel, be checked by hypnosis. At present, I am endeavouring to find both the time and a suitable subject. The procedure should, I think, be relatively simple.

While the writer has had the pleasure of preparing this paper, yet he wishes to record with gratitude the loyalty and co-operation of Dr. Robert Gregory and Dr. Gerald Graham, members of the staff of the Provincial Hospital. The names of Drs. George Hatfield and W. O. McDonald must be particularly mentioned. Dr. Hatfield has had the actual charge of the hypoglycæmic work since its inception, while Dr. McDonald, as visitor in metabolism to the hospital, has been of invaluable help.

As a result of their experience with nine children, almost all from families on relief, who were suffering from a peculiar skin disease, and in view of the reports of other investigators, Drs. Lehman and Rapaport believe such cases will be found not infrequently among underprivileged school children. The disease has been called "goose-skin" but Drs. Lehman and Rapaport believe the term "toad-skin," introduced by Lucius Nicholls, is most descriptive. The disease occurs chiefly on the front and sides of the extremities, particularly the thighs and calves of the legs, and less frequently and less markedly on the arms. Also the abdomen, buttocks, back, neck and face are at times involved. The growths are horny plugs that protrude from the hair sacs and often contain a broken-off or an unerupted coiled hair. If a large plug is picked out of the skin a hole or depression is left. With the disease there is a marked dryness of the skin and there may be moderate itching. There is also a loss of hair in the affected areas. A dryness and scaliness of the scalp occur in some cases and when present on the face slightly resemble acne. Dietary investigations show that almost all the individuals or groups of individuals reported with these skin lesions have been on a diet deficient in vitamin A.—*J. Am. M. Ass.*, 1940, **114:** 386.

VERTIGO*

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THE subject of vertigo is so large that it is impossible within the compass of a short paper to do more than give a brief review of some of its aspects. I shall confine myself to those which seem of the most interest and importance, and make no attempt to be comprehensive.

The mechanism of balance.—Vertigo is the expression of some interference with the normal mechanism whereby balance is maintained. This mechanism consists of a complicated system of reactions which, conscious in the child learning to walk or swim, soon assume the position of conditioned reflexes below the level of consciousness. Once automatic, these reactions do not thereafter rise again to the level of conscious acts unless compelled by some external force—large as in the shape of an earthquake or so materially insignificant as a piece of orange peel. In man, many organs play their part in the maintenance of the erect posture—the ears, the eyes, the neck muscles to keep head, ears and eyes in optimum position, the tactile corpuscles in the skin, the sensory elements in tendons and ligaments surrounding joints. A lesion of any one or more of these organs or of their central connections may result in a sensation of disturbed balance, and therefore each of them has to be considered in the investigation of a case of dizziness. To the patient the ataxia of tabes may be as much dizziness as the vertigo of labyrinthine disease.

But the master-organs of balance are the labyrinths, and interference with the function of them or of their nervous pathway is the most common cause of true vertigo. They may be likened to two gyroscopes. Let them both revolve at the same pace and the ship is steady. But let the pace of one be altered, whether in the direction of increase or of decrease, and the balance is disturbed. The more rapid the onset of the lesion, the more likelihood there is of vertiginous attacks. It is a common observation to find a dead labyrinth in long-standing suppuration of the middle ear without any history of dizziness; death of the labyrinth has taken place gradually. But let the labyrinth be attacked acutely and its function be abruptly destroyed and vertigo will be extreme. The same applies to a central lesion—the more rapidly growing tumours are more liable to produce dizzy attacks, perhaps by alterations in surrounding vascularity or œdema, than the slower growing. The acuteness of central attacks can be as great as of peripheral.

Diagnosis.—This brings me to the question of what criteria we have to determine an accurate diagnosis. Too often the patient's complaint of dizzy spells is accepted as evidence of true vertiginous attacks without further question, to the detriment of diagnosis and the justification of those who call Ménière's disease a diagnostic scrap basket. Since it is seldom that the physician is present during an attack, and between attacks signs may be absent, accuracy of diagnosis will depend most often upon accuracy in history-taking. Unfortunately, history-taking is an art which of recent years has lapsed sadly into desuetude with the advent of the x-ray machine and other substitutes for thought. It takes time, and today time is at a premium. If nevertheless we take that time it will be found that the sensations which people experience who suffer from vertigo produced in the vestibular tract, and especially in the end-organ, the labyrinth, fall broadly into four groups.

1. *Objective sensation of movement.*—External objects appear to move, most commonly, in a horizontal plane and in rotary fashion. More rarely they move in a vertical direction, the floor seeming to come up to or fall away from the patient, which usually results in a fall. Not infrequently a clear description cannot be obtained. It is under these circumstances that associated symptoms, such as deafness, tinnitus, nausea, assume an added importance, and in particular one, that of the persistence afterwards of a feeling of unsteadiness which may last for hours or even days. A fair criterion to demand for a diagnosis of an attack of true vertigo is that it shall have a sudden onset, a short duration and a definite aftermath.

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2. *Subjective sensation of movement.* — The same movements which were referred to external objects in the previous category are in this referred by the patient to himself. Sensations of spinning around, swaying, falling, either in a given or in any direction, are common. Sometimes the patient feels as though hit by an invisible force.

3. *Actual movement.*—In this group the patient sways, staggers, or actually falls. There may be associated movement of external objects, but usually the patient is so occupied with trying to keep on his feet that he fails to notice the presence or absence of this feature. This falling due to labyrinthine disease has to be carefully distinguished from such other causes as syncope, petit mal, cataplexy, Stokes-Adams syndrome, and it can be that there is great difficulty in differentiation. In this the aftermath of unsteadiness is of great help, for only after an attack of true vertigo does it occur.

4. *Postural instability.*—We have noted the aftermath of instability associated with true attacks of vertigo, a sensation often described as though of being on the deck of a ship when a slight sea is running. In this fourth group the same sensation is experienced, but only in certain positions. It may be present on walking but not at rest, it is often associated with certain positions of the head, and there frequently goes with it a fear of falling and a general loss of confidence.

SITES OF ORIGIN OF VERTIGO

Such are the types of vertigo which are produced by labyrinthine disease. In the case of the first three, and in the more severe attacks, the vertigo is accompanied by nausea or vomiting, pallor and sweating, the picture so familiar to those who go seafaring. Sensations of this nature, however, arise not only from affections of the labyrinth but also from diseases of other parts of the vestibular tract. It is true that, in general, vertigo from disease of the labyrinth is more severe in character and more frequent in incidence, but lesions of the afferent tract can also produce vertiginous attacks indistinguishable, unless other signs are present, from labyrinth attacks. The more acute the lesion the more likely is there to be vertigo. No conditions, for instance, produce more severe or persistent vertigo than posterior inferior cerebellar thrombosis, encephalitis, and acute multiple sclerosis. I wish, therefore, to leave out of consideration for the moment disease of the labyrinth, and to consider briefly where else in the vestibular tract lesions present vertigo as a leading symptom, and how commonly.

Lesions of the cerebello-pontine angle.—It has been asserted that vertigo is a frequent concomitant of eighth nerve tumours (Stewart and Holmes,[3] Scott[4]). On the other hand Cushing[5] found it in only 5 out of 33 cases. Cairns[6] records 11 cases of which 6 had vertigo, and in two only as an early symptom. I have known it to occur as the first and for some time the only symptom in one case. In other lesions of the cerebello-pontine angle this symptom is equally inconstant. It is possible that in these cases vertigo when present is produced not by the effect of the lesion on the nerve, which seems peculiarly immune to insult (Dandy[7]), but by pressure on the brain stem and interference with its blood supply.

Lesions of the brain stem.—It is in this situation in particular that the acuteness of the condition seems to determine the presence of the symptom. Thrombosis, encephalitis, and multiple sclerosis have already been mentioned as causing severe vertigo. On the other hand, the slower-growing tumour of pons and medulla, while involving the same structures, seldom produces it.

Lesions of the cerebellum.—A feeling of unsteadiness is very usual in sub-tentorial tumours, but vertigo as it has been described in this paper is rarely found in lesions confined to the cerebellum. When it is present it is an indication that the tumour is situated in the middle lobe rather than in a lateral and is pressing on the brain stem.

Lesions of the cerebrum.—We are still ignorant of the connections between the cerebral cortex and the vestibular nuclei, though we know from clinical observation that they exist. Sudden vertigo is frequent as an aura in epilepsy, and may occur alone like other epileptic auras, but it is important for diagnosis to remember that it is never followed by the aftermath of unsteadiness which we have noted as so characteristic of disturbance at the lower levels. Vague sensations of dizziness are quite usual with any intracranial tumour during periods of increased pressure, but true vertigo may occur, and most commonly when the tumour is in the frontal lobe. In a case of frontal meningioma

it was the first symptom—the patient was riding a bicycle and fell off. The mimicry of the subtentorial tumour by one in the frontal lobe continues to deceive us from time to time.

Traumatic vertigo. — A paper on vertigo would be incomplete without mention of the dizziness and even vertigo which so often follows even minor injuries to the head. The symptom usually appears after an interval of a few days, may be slight or severe, and occurs characteristically on movement of the head. Sometimes there may be intense vertigo which is present in certain positions of the head only. Because of the absence of deafness and tinnitus these cases have in the past been referred to the brain stem. Using a quantitative method of vestibular testing which I have recently described,[12] I have found that the greater number of these cases show an abnormal vestibular response on one side. This finding agrees with those of others[8, 9] and seems to place the defect definitely in the labyrinth. Moreover, in a large number of cases careful radiography of the petrous bone will reveal a fracture.

Vertigo and psycho-neurosis. — Vertigo, or rather a more or less continuous unsteadiness and fear of falling, is a very common symptom of minor states of mental depression. One must beware, however, of labelling too readily as neurasthenia cases of vertigo—and how many there are—for which no immediate explanation can be found, as one must equally beware of discounting the dizziness of a psycho-neurotic. More of these cases than is realized have a minor lesion in the ear.

Lesions of the labyrinth.—We come now to the commonest source of vertiginous sensation, the labyrinth. I have likened the labyrinths to two gyroscopes which must act equally if balance is to be maintained. If anything happens to put one out of tune with the other then certain symptoms will appear which are conveniently described collectively as *the syndrome of the labyrinth*. They consist of vertigo associated with nausea and vomiting, nystagmus, past-pointing and falling. If we consider the direction of nystagmus as that of the slow component, which is in fact the *true* movement, then *the direction of the last three is the same, away* from the more active ear.

Lesions of the labyrinth are of two kinds, those due to infective processes and those due to non-infective.

SUPPURATIVE LABYRINTHITIS

I will not detain you long with this part of our subject. I would only remind you of three points.

1. Dizziness associated with suppuration in the ear is a danger signal which means involvement of the labyrinth. Accompanied as it is by nausea, vomiting and sometimes diarrhœa, it is often mis-diagnosed as a "bilious attack" or some other acute gastro-intestinal disturbance, with sometimes fatal results. A bilious attack with an infected ear is labyrinthitis until proved otherwise.

2. The first stage is one of irritation. It is seen not only in chronic suppuration but also quite frequently in acute cases while the drum is still intact. A serous or irritative labyrinthitis is produced by the adjacent infection in the middle ear. The diseased ear is the active ear and signs are to the opposite side. If now the infection progresses and active organisms invade the labyrinth producing an acute suppurative labyrinthitis, then the labyrinth dies, its function ceases, and the healthy ear becomes the more active. The signs therefore change round. *In the presence of a suppurating ear, a nystagmus which, from beating in one direction, suddenly changes and beats in the opposite direction, is a sign of the gravest significance.*

3. Suppurative labyrinthitis demands urgent recognition, not because of its effects upon the ear but because of its threat to the meninges. The danger of labyrinthitis is the meningitis which may result.

NON-SUPPURATIVE LABYRINTHITIS

Ménière's disease.—I have time only for a short review of this very complicated subject. The complete syndrome is characterized by paroxysmal attacks of vertigo with nausea and vomiting, and associated with progressive deafness and tinnitus.

The attack.—These patients, if seen in an attack, show all the signs of an acute labyrinth disturbance, with usually the deafer ear as the active one. There is severe vertigo with nausea and often vomiting, a nystagmus the quick component of which is in the direction of the more active ear, while past-pointing and falling are in the direction away from it. The victim prefers to lie on the side of the affected ear, feeling less dizzy so, and usually prefers a darkened room on account of a mild photophobia.

It is, however, not very often that the doctor witnesses an attack, and he is usually forced to fall back upon the history for a diagnosis. The types of vertigo commonly encountered have already been described, but there are various other symptoms associated with labyrinthine attacks which help to clinch the matter.

Associated symptoms. — Disturbances of the autonomic nervous system are the most common. In addition to the pallor, sweating, nausea and vomiting which have already been mentioned, there is frequent complaint of abdominal distension and flatulence, while some patients have increased peristalsis which may result in an uncontrollable motion of the bowels during an attack.

Occipital headache, stiffness in the muscles of the neck, pain behind the ear are complained of between attacks, and are in fact one of the most constant features.

Diplopia is a rarer but undoubted symptom and it is important to know because of its bearing on differential diagnosis.

Diminished tone of the neck muscles, rarely also of the limbs, on the affected side is another not uncommon sign of recent labyrinthine disturbance.

Premonitory signs of an attack, while not as frequent as the aura of epilepsy, are quite common. They take various forms—a fullness in the head, a sense of unsteadiness, a sensation in the ear. Frequently patients will say that for some days beforehand they "feel it piling up", then "it" spills over in an attack and they feel better — a very significant description if the theories to be discussed later are correct.

VARIETIES OF PAROXYSMAL VERTIGO

So much for the characteristic case as described by Ménière. But there are other cases of paroxysmal vertigo which, while they do not conform strictly to Ménière's definition, have many points of similarity, and are indeed often labelled Ménière's disease.

1. *Vertigo accompanies or increases deafness.*— This is the classical variety described by Ménière.

2. *Vertigo follows and relieves the deafness.*— The "vertigo which makes one hear" as Lermoyez, who described this group, expresses it. The deafness is a sort of aura which warns of an attack and may precede it by several days.

3. *Vertigo antedates the deafness,* which is never severe, sometimes by an interval of years. Sometimes even deafness does not appear at all. Headache and occipital pain may be severe and sympathetic disturbances prominent, so that the cases are often called migraine. I believe they are very closely allied to it. I have records of several patients whose earlier migraine has stopped with the onset of their dizzy attacks.

Epilepsy also is in some way woven into this picture. The substitution of epilepsy for migraine in the same patient is not uncommon, nor is vertigo for epilepsy. I have had no personal experience of a case in which the three conditions have been present, but Symonds[2] mentions two such cases, giving details of one, in which migraine, Ménière's disease and petit mal followed the one on the other during the years.

4. *Vertigo continuous but variable in degree,* which may be unassociated with hearing loss. Comparable to this type of vertigo, or more accurately vertiginous sensation, is the deafness which comes and goes—today the patient hears well, tomorrow is severely deaf, the day after hears again. Tinnitus may follow the same course. The three symptoms may be present together or independently, and all combinations of the three may occur. I believe these patients form a single group owning a common general cause. That cause is an individual biochemical peculiarity of the cells of the particular organism. Their biochemical peculiarity may be a sensitivity to some foreign protein in air or food, it may be to an organism which they harbour in themselves, or it may be that the cellular peculiarity has come about by a deficiency of some essential substance, vitamin, hormone or the like. An example is better than all the generalizations.

The patient, a man of 32, complained of a very variable deafness and tinnitus. Both symptoms were at times almost absent, at other times so marked that he could not use the telephone on the right ear. There had been occasions when he had felt vaguely dizzy, especially recently, and it was this which brought him to consult me, but never had he suffered anything in the nature of an attack of vertigo. He denied all the ordinary manifestations of allergy including migraine, but volunteered that he had suffered from "bilious attacks" since boyhood and still had them frequently. He also had a constant post-nasal drip, colds of vasomotor type, a stuffy nose and thick head and, interestingly, a recurring suffusion of the eyes for no apparent cause which had been called most things from conjunctivitis to interstitial keratitis. Other than diminished hearing of combined type in both ears with normal vestibular reactions and open Eustachian tubes there was no finding of note. His diet was simple but adequate, and he knew of no foods that disagreed with him. He did not care for meat and ate little of it, but drank about two quarts of milk a day. "I'm a calf for milk", said he. He did not smoke or drink. As a shot in the dark,

before going in for elaborate skin-testing, he was taken off milk, with almost miraculous results. His hearing improved, and his tinnitus disappeared in a few days, he woke in the morning with a clear head, his catarrh improved and his bilious attacks ceased. He inadvertently proved his case one day by eating a cheese sandwich, not connecting cheese with milk, with a return of all symptoms, including a bilious attack.

Pathology. — The pathology of paroxysmal vertigo is still largely unknown, but we can build up some sort of a picture from the many clinical facts and the few pathological observations in our possession.

The site of the lesion is in the great majority of cases in the end-organ, the labyrinth. The neurologists, or some of them, are fond of arguing the case for a lesion, nature unspecified, in Scarpa's ganglion. This postulate, first put forward by Dandy, does not explain all the facts. It does not, for instance, explain the association in most cases of cochlear with vestibular dysfunction, but more particularly it does not explain why so many cases can be cured by a method which cannot affect the ganglion, by Eustachian catheterization. The consensus is that the lesion is in most cases in the end-organ. This view has had striking confirmation recently in the report by Hallpike and Cairns[13] of the histological examination of the temporal bones in two cases of Ménière's disease which died after an operation for 8th nerve section. In each case there was found an almost identical lesion, a gross dilatation of the endolymphatic system which had led to rupture. When one remembers those people who complain of the sensation of a piling-up of something which bursts in an attack the finding acquires an even greater significance.

In the remaining cases the lesion is central, in the vestibular nucleus. Certain poisons act centrally, notably alcohol and nicotine, and possibly others, while there is some evidence, such as their kinship to migraine and epilepsy, to suggest that those cases of vertigo comprised in the third group, in which frequently there is no hearing change, are due to a transient central œdema of allergic type.

The nature of the lesion.—If there is one thing more certain than another among all these complications, it is that there is no one single cause of Ménière attacks. There may even be more than one cause acting in the same patient. It is possible that a condition which in itself is insufficient to produce vertigo may, if reinforced by another also inadequate alone, become powerful enough to explode the charge. Many individual lesions have been suggested. Mygind and Dederding[11] believe that the answer to the problem lies in an intracellular œdema due to water retention; Furstenberg[14] condemns the sodium ion, Madelaine Brown and her colleagues,[15] the potassium; for Wright[16] some hidden infection producing a serous labyrinthitis is the cause; Adam[17] incriminates avitaminosis; Portmann[18] suggests variations in the size of the vessels, perhaps mediated through the sympathetic system, a vasomotor phenomenon; some cases are undoubtedly on an allergic basis. No one of these causes fills the entire bill.

But if we examine these various theories critically we are struck by one common feature, that the attacks are attributed by all authorities to a water-logging of the labyrinth. This water-logging, this excess of fluid, may be postulated to involve its cells, its endolymph system or its vessels, but each one agrees on a fluid excess. In the final analysis it is the endolymph system which must bear the ultimate force of the attack, for either intracellular œdema or vascular variations could upset the endolymph circulation. As objective evidence to support this theory we have Hallpike and Cairns' two cases.

There is another part of the matter. Many people suffer from the general conditions mentioned—foci of infection, allergy and the like—who do not have Ménière attacks. What is it which conditions the local manifestation? It must be admitted that in many cases we do not know, any more than we know why one allergic subject manifests his allergy as asthma, another as migraine, and so on. In other cases, however, we can find a local lesion. It has been remarked by many observers how frequently a stenosis of the Eustachian tube is found in cases presenting Ménière attacks. It is found more frequently than is realized, sometimes only in minor degree and to be distinguished only by careful comparison with the other ear. But there it is, and its adequate treatment will often suffice to eliminate the attacks.

This, then, is how I visualize the basis of paroxysmal vertigo. Apart from central cases, there are two types of peripheral case. In one group of cases a single severe condition causes the attacks. A blocked (not merely stenosed) Eustachian tube will, as we know, produce intense vertigo. There is no reason why a hypersensitivity should not show itself as well in one

labyrinth as in one cerebral hemisphere; or why the vessels in one labyrinth should not be more degenerated than those in the other. These single causes will produce attacks. In the other group of cases the single lesion is not enough. The Eustachian tube is only narrowed, the allergy or vascular disease, or whatever it may be, is not sufficient of itself to upset labyrinth balance. But add the two together, stenosed tube to mild allergy, and the summation may be enough to fire the train. Cure either and the attacks stop.

TREATMENT

The matter of treatment has been largely covered in the previous discussion. It involves a search for, and treatment of, both a general and a local cause.

I will only remind you briefly of the general causes we have considered and for which each patient must be investigated. The irregular life must be regulated, the regular life damped down, and sufficient sleep ensured, a purpose admirably served by phenobarbital. Irregularities and inadequacies of diet must be attended to and gastro-intestinal disturbances dealt with—hot water before meals and a regular laxative have alone been known to work wonders. Tobacco and alcohol are forbidden, foci of infection hunted out. An allergic tendency is sought by close questioning, hormone deficiencies investigated, especially in women of middle age. Hyperpiesis is a factor to be considered in the elderly, remembering that it is an anæmia due to a pressure which for the moment is too low, not too high, that causes the vertigo in these patients. Efficient treatment along these lines will often be all that is necessary.

A few words concerning Furstenberg's regimen of salt-free diet and ammonium chloride. I personally have had no success with it, though I have hospitalized patients and treated them according to the letter of the law. One patient had the worst attack of his life while in hospital under the strictest supervision. Nor have I so far had any better luck with potassium chloride, though up to date the number of cases on whom I have tried it has been small. I am persisting, but I admit with some scepticism.

The usual local cause found (leaving suppurative conditions aside) is Eustachian stenosis. However slight it may be, it must be overcome, for its continuance may be sufficient to tip the balance. The milder cases may be overcome by simple repeated inflation; the more severe will require the passage of a bougie, regularly, repeatedly and over a long period. I am prepared to enter the lists with any of those who say that Eustachian bougies should never be used. Admittedly, they must be used with care and judgment—but so must strychnine. A stricture of the Eustachian tube demands the same sort of treatment as stricture of the urethra, repeated and long-continued dilatation, until it is permanently overcome. A false passage can be made in tube as in urethra, but that is the fault not of the bougie but of the man behind it. Adequate treatment of Eustachian stenosis on these lines has relieved Ménière attacks at the hands of many others as well as of myself.

Finally, a word on section of the 8th cranial nerve. The operation has a real if limited application. When the resources of investigation and therapy have been exhausted without relief, when the situation is such that life is unbearable, when circumstances are such that immediate relief is imperative, then the operation is justified. It is the rapid way out of an intolerable situation. But we must not be blind to its limitations. It is in the first place a most unphysiological procedure. To divide a functioning nerve tract in order to relieve a symptom of whose origin we are uncertain is simply to cut the cable to prevent the message coming through—it does nothing to control the writing of the message.

So long as this operation is recognized as a last resort on which we can fall back when defeated in our search for rational therapy, and so long as its application is confined to cases of peripheral origin, well and good. To proclaim it, as it has been proclaimed, as the only method of treatment for Ménière's disease[19] is a misrepresentation of fact.

CONCLUSION

It will be apparent that the complete investigation of a case of vertigo demands the cooperation of many interests. The breadth of vision of the general physician is needed, not the keyhole view of the specialist. Like truth, vertigo has many facets, and the snap diagnosis has no place in its investigation. On the contrary, nothing but meticulous care will avoid mistakes which, if operative, are irretrievable. But that self-same care which prevents mistakes may also lead to Roman triumphs.

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DIFFERENTIAL DIAGNOSIS OF THE CAUSE OF RECURRING ABDOMINAL PAIN IN INFANTS AND CHILDREN*

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THE children of Canada are threatened with death from appendicitis in gradually increasing measure as the years go by. This opinion is the result of the study of data furnished by the courtesy of the Dominion Bureau of Statistics covering the ten years 1928 to 1937 inclusive. The first curve shows the *estimated* total population to be gradually rising. The second curve covers the death of children from all causes during this period, and we may draw considerable satisfaction from the steady fall. But the third curve, deaths of children from appendicitis, shows no such fall, but a slight but definite rise. In the fourth curve the percentage of the total child deaths that have been due to appendicitis shows a remarkable climb, and drives home the conclusion that the satisfactory progress being made in saving children from death from other diseases is not being matched in disorders of the appendix. In 1929 appendicitis was 12th on the list of causes of death; in 1936 it had risen to 9th place. If the number of deaths per 100,000 population is plotted as a curve it appears that the increasing population is approximately keeping pace with the rising death rate, and 5 children in every 100,000 estimated total population died in 1928 and the same number in 1937.

In the Children's Memorial Hospital, Montreal, the death rate from diseases of the appendix has been steadily falling during the past five years. At the Montreal General Hospital it has remained practically stationary, in the neighbourhood of 1 per cent. If this experience is typical of the results in other Canadian hospitals one is forced to conclude that the increasing mortality in the whole country is probably due to a general increase in the incidence or in the severity of the disease. It is the

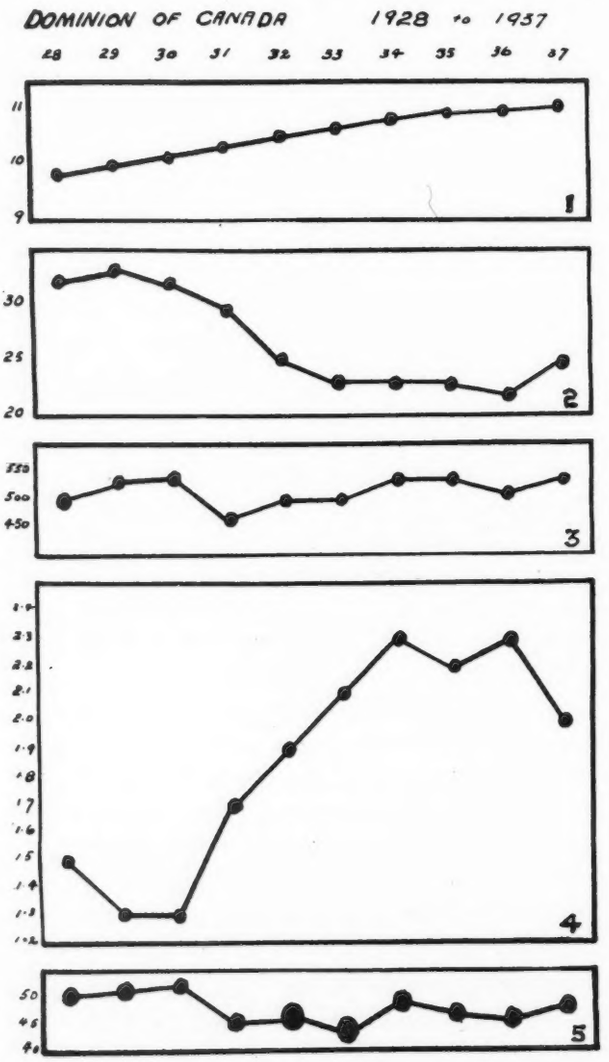

Fig. 1. — Curve showing increase in population (millions). **Fig. 2.**—Curve showing deaths of children (thousands). **Fig. 3.**—Child deaths from appendicitis. **Fig. 4.**—Percentage of deaths of children due to appendicitis. **Fig. 5.**—Child deaths from appendicitis per 100,000 of total population.

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obvious duty of those of us who are responsible for the health of children to do what we can to correct this undesirable state of affairs. As a practical measure I would suggest that we consider for a few minutes that group of children whose only complaint is recurring abdominal pain without any typical pattern of story or clinical findings to point to a diagnosis. In no other condition are we in need of help as much as in this. Wholesale removal of the appendix in every child with pain obviously will not solve our difficulty. Like most of my surgical colleagues I object to being placed in the awkward position of having removed a normal appendix from a child suffering from abdominal pain, and having the pain continue without abatement when the patient has recovered from operation. Further, as will be seen, many of the patients that I shall report to you were suffering from some other condition which could in no way be helped by appendicectomy.

At the outset there might be some profit in dividing all of these patients into two groups: (1) Those who have had a previous attack that could with reasonable certainty be blamed on the appendix. (2) Those who are not suffering from appendiceal disease at all, but from some other condition that can be diagnosed by special test, or some refinement of laboratory examination, or even by exploration of the opened abdomen.

With reference to the first group, few will disagree when it is proposed that the appendix should be removed without unnecessary delay. The difficulty, of course, is in being certain from the clinical story as presented to us that the previous attack, or attacks, at which we were not present, had the features of appendicitis, either of the ulcerative or the obstructive form. The only suggestion that I have to bring forward on this point is the following: if it can be shown that the *order* in which the events occurred during an attack were: first, pain, then vomiting, then tenderness, then fever, this *sequence* itself is the strongest support that I know of for a diagnosis of appendicitis.

In a study of the last 85 cases of acute appendicitis in children that have come under my care during the past four years 63 were found to have been admitted during the first attack of abdominal pain, but to my surprise, on reviewing the clinical histories, 22 (25.4 per cent) gave a story of having had definite previous episodes of abdominal pain that presumably arose from disease of the appendix. This is the group in which I feel our great opportunity lies. Nature gives us this warning of impending disaster: the operation in the interval is perfectly safe; here, if anywhere, is an opening for constructive attack on the mortality curve. In the two hospitals (Montreal General Hospital, 1929 to 1938 and the Children's Memorial Hospital 1933 to 1938) there have been 479 operations for "chronic appendicitis", many being interval cases, without a single fatality. The lesson to be gleaned from these figures is an old one, but apparently it has to be re-learned at intervals. Once the appendix can be blamed with reasonable certainty for an attack of abdominal pain its removal should be advised.

Turning to the second group, *i.e.*, those children with recurring abdominal pain in whom some other condition than appendiceal disease has finally been proved to be present, we might review with profit the ultimate diagnosis and the method of its establishment in a series of cases seen in the Children's Memorial Hospital, in the hope of lending some assistance in sorting out from this group those that can be helped by our therapeutic measures. These patients are divided according to the final diagnosis into the conventional groups of: (1) developmental anomalies; (2) traumatic conditions; (3) inflammations; (4) new growths; (5) special disorders.

DEVELOPMENTAL ANOMALIES

The abdominal wall.—Diaphragmatic hernia; dextrocardia with attacks of dyspnœa are the clinical features that suggest the condition, and the diagnosis is made by x-ray.

The urinary tract.—Double ureter; ureterocele; hydronephrosis and dilatation of the ureter; uretero-pelvic stricture. These conditions may all be accompanied by vague pain in the abdomen, and intravenous pyelography has been the means of diagnosis in this group.

Ureteral stone. Again, the indispensable x-ray has pointed the way to the secret of vague abdominal distress in a child.

Genital tract.—Hæmatocolpos proved to be the cause of pain in one child aged 13. The diagnosis made by vaginal examination.

Intestinal tract.—Malrotation and volvulus. Two patients seen with this condition had recurring attacks of high intestinal (duodenal) obstruction, and the correct diagnosis was sug-

gested by the barium drink, and confirmed by operation.

Meckel's diverticulum has been found to be the seat of diverticulitis (with acute ulceration in one case), intussusception, and chronic ileus, with or without attachment of the diverticulum to the umbilicus.

Although we have used the x-rays with barium drink in this series, the presence of a diverticulum was not revealed by this means alone in any instance. The diagnosis was made in each case by operation.

TRAUMATIC CONDITIONS

Pancreatitis.—One child, run over by a motor car, complained of upper abdominal pain, and at operation a contusion of the pancreatic body, with fat necrosis was found. A pancreatic fistula developed in the wound and healed spontaneously.

INFLAMMATIONS

Pancreatitis with mumps. — This has been noted in the case of one young girl who complained of epigastric pain and was found to have local tenderness in the left subcostal region (tail of the pancreas) for a period of three weeks following the subsidence of an attack of mumps. The opinion is only a clinical one, based on the persisting local tenderness on pressure.

Osteomyelitis of the pelvis.—Experience in two cases of chronic abdominal pain would indicate that this disease may exist for a long period and be accompanied by a low febrile reaction for many days before a frank abscess can be felt.

Non-specific mesenteric lymphadenitis.—This disorder is becoming so common that it is often possible to make a tentative diagnosis before the abdomen is opened. The pain is paraumbilical, the tenderness midline, left iliac or right iliac, but the tender point can often be found to shift its position by rolling the child on one side. The fever is often 101 or 102° F. There is no muscular splinting and rarely vomiting. At times a vague mass can be palpated. At operation the appendix is normal, but the para-intestinal, intermediate and central mesenteric lymph nodes are enlarged, discrete and œdematous-looking. The greatest change is usually found in the nodes of the ileo-cæcal angle, but there is generally a large group high up in the superior mesenteric artery near its origin. After the innocent appendix has been removed the fever and abdominal distress may continue for many days.

Although our colleagues the pathologists are reluctant to agree that this condition actually exists as a clinical disease, because there is such a great variation in the size of the mesenteric lymph nodes under conditions that are considered normal, most clinical surgeons meet the condition often enough to feel that a place must be found for it in our classification of childhood abdominal diseases. A series of 7 cases of this disorder operated upon during the past two years have reported for re-examination during the past month in response to circular letters. All seven have been gradually relieved of all abdominal symptoms after the removal of an appendix that was normal on histological examination.

Tuberculous lymphadenitis in the stage of calcification has been detected during x-ray abdominal examinations, and presumably was responsible for chronic abdominal distress.

Chronic ulcerative colitis.—One patient can be reported with this disease, the diagnosis being made by viewing the ulcers through the proctoscope, and confirmed by barium enema examination.

Tuberculous peritonitis seems to be disappearing from our wards, although the plastic form is still encountered in miliary infection. A brief general anæsthesia may be needed for satisfactory abdominal palpation to detect the irregular masses varying in consistence from one part to another.

Chronic inflammation of the appendix is a rare entry in the pathological reports. Only 7 instances are among the cases in the last 4 years that have returned for post-operative examination. Of these 5 have been relieved of symptoms by operation and 2 still have abdominal complaints. Under the microscope these appendices have shown: a wheat grain embedded in the submucosa with foreign body giant-cell reaction; vegetable or fruit seeds (fern); oxyuris vermicularis in the lumen and chronic inflammation in the wall.

NEW GROWTHS

Benign.—A dermoid cyst of the ovary, easily recognizable on digital examination of the rectum, was removed from a young girl complaining of periodic abdominal distress. The x-ray showed the imperfectly developed teeth in the cyst.

Malignant.—A sarcoma of the intestine causing incomplete intestinal obstruction and crampy abdominal pain has been resected and the child is rapidly growing to manhood. One boy was admitted with vague abdominal pain, and sent home when we could find no adequate cause. He returned promptly, and when the abdomen was carefully palpated when he was asleep an undue prominence of the lumbo-sacral eminence was found. The abdominal exploration revealed an incurable retroperitoneal malignant neuroblastoma. Another child was found to have Hodgkin's disease when the abdomen was opened in a search for the cause of obscure abdominal distress. Still a third had a malignant retroperitoneal growth that has not been finally classified. These three cases have been a warning to us that vague abdominal pain may be the initial and only symptoms of incurable abdominal malignant growths in a child.

SPECIAL CONDITIONS

Cysts.—A cyst of a hydatid of Morgagni with torsion and hæmorrhage was found in the pelvis, accompanied by blood-stained fluid peritoneal exudate. A mesenteric cyst, large enough to be mistaken for ascites, was removed with resection of small intestine.

Plumbism.—Publicity given to this condition has diminished the number of clinical cases seen in surgical consultation in patients with abdominal pain, but the x-ray examination of bone, the lead line, the search for stippled red blood cells, and urine lead elimination tests are still indispensable aids to accuracy in diagnosis.

Worms.—The barium drink will bring round worms to light if the ordinary clinical tests fail. *Oxyuris vermicularis* in the appendix seems to be steadily increasing in frequency. This increase affects the well-to-do as well as the children of the poor, and the only explanation that I can offer is the increasing consumption of uncooked fruit and vegetables that have not been sufficiently washed to remove contaminating ova. The records of my service show a large number during the past five years. In response to a circular letter I have been able to re-examine 15 patients during the past month. Of these 12 have been completely cured of symptoms by the removal of the appendix containing the worms. There are, however, 3 who still have complaints and who are still infested with the parasites. Examination of the stool for ova has not helped in diagnosing this disease.

The *onset of menstruation* may lead to periodic abdominal pain that disappears when the cycle is established.

Cyclic vomiting can usually be detected by the repeated attacks, and by the *sequence* in which the events occur in any attack, *e.g.*, (1) constipation and flatulence; (2) fatigue and irritability; (3) acetonuria and pallor; (4) vomiting; (5) indefinite abdominal pain. Removal of the appendix between attacks leads to disappointment, as the disorder continues.

Oncoming rheumatic fever.—The abdominal symptoms that may appear a day or two before joint enlargement are well known. The early rise of the sedimentation rate as a diagnostic aid has some reputation.

Chronic intussusception differs from the acute variety in the absence of three cardinal signs—melæna, intestinal obstruction, and vomiting. The abdominal mass may be out of reach under the costal margin, and in such instances nothing but a barium enema will settle the diagnosis.

Megacolon (Hirschsprung's disease).—Infants with extreme grades of constipation in whom enemas continue to bring away particles of stool in spite of prolonged repetition, may be suspected of this disease. But for accuracy the x-ray must again be turned to, and the enema with opaque material will settle the issue.

SUMMARY

A list of abdominal conditions causing pain has been recited, and in each instance the final diagnosis and the method of arriving at it has been given.

One might refer to:

1. The dextrocardia and repeated attacks of dyspnœa in *diaphragmatic hernia.*
2. The great value of intravenous pyelography in *urinary tract disease.*
3. The shifting of the point of tenderness with altered posture in *mesenteric lymphadenitis.*
4. The use of the *proctoscope* in revealing ulcers in chronic colitis.
5. The use of a *brief general anæsthetic* for palpation of the abdomen in search of tuberculous masses or malignant growths. Palpation of the abdomen with the patient asleep has been helpful at times.
6. *Acetonuria* at the onset of an attack of cyclic vomiting.

7. And finally, our reliance on the x-ray for the diagnosis or confirmation of diagnosis in almost every instance.

But when all this has been said there remains the challenge thrown up to us by the curve of the increasing importance of appendicitis as a cause of death in Canadian children. The course that this curve is to take in the future rests to a large extent in the hands of those present in this room today. The appendix should be removed forthwith if it can reasonably be blamed for an attack of abdominal pain in a child. The operation is safe, and even though one may be disappointed to find a normal organ when the microscope is finally used, one can also be certain that something has been done to correct the unsatisfactory increase of deaths from this disease. The parents will with certainty be guaranteed against the worry and financial strain of an operation in the acute stage, the child will never have to face perforation and peritonitis with all its complications; the child will not die of appendicitis.

DIABETIC COMA*

BY A. F. FOWLER, E. H. BENSLEY AND I. M. RABINOWITCH

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IN 1937 we reported in this *Journal*[1] a new method for the treatment of diabetic coma. It was then shown that with one simultaneous injection of unmodified insulin and protamine zinc insulin the blood sugar was rapidly reduced to the normal level and was maintained at that level for many hours, in spite of administration of many hundreds of grams of carbohydrate. That the large amounts of carbohydrates administered were utilized either by oxidation or storage and not merely retained artificially was shown by the perfectly normal blood sugar at the end of each period of observation. That this method was superior to the use of unmodified insulin only was suggested from the rapid disappearance of the acetone bodies from the breath and urine and the rapid recovery clinically.

The treatment of the above-mentioned subjects was not uniform; three different combinations of unmodified insulin and of protamine zinc insulin were used. Other combinations have been used since then and, in all, a total of 26 patients have been thus treated. Amongst the latter there were four deaths, but, as will be shown, one only might be chargeable to any method of treatment. Two of these patients were moribund on admission to the hospital and another responded very well to the treatment and recovered completely from the coma, but died later of the condition which precipitated the coma, namely, a combination of bilateral otitis media, bilateral phlebitis and bilateral pneumonia. For statistical purposes, however, they are included, and properly so, under "death from coma".

Analysis of the data showed that of the 26 cases 16 were given 100 units of unmodified insulin intravenously, and 100 units of unmodified insulin and 200 units of protamine zinc insulin subcutaneously. All of the four deaths occurred in this group; amongst the 10 cases treated with other combinations of the two types of insulin there were no deaths. As will presently be shown, however, this "100-100-200" dosage was found to be the best method. It has the following advantages.

1. The advantages of the old method of treatment are retained. For example, the initial dosage of insulin is large. In fact, it is much larger than the average initial dosage under the old method. It will be noted that no patient receives less than 200 units of unmodified insulin at the one injection, and a fact which cannot be emphasized too often is that the fear of death in coma should always be from underdosage rather than from overdosage of insulin. A person dying in diabetic coma is dying from lack of insulin, and insufficient dosage will almost certainly result in death, whereas, according to the literature, death from overdosage of insulin in the treatment of coma must be extremely rare. We have not as yet met with it in this clinic.

2. Another advantage of this method of treatment is the invariable injection of unmodified

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insulin intravenously. This ensures quick action of the insulin—another essential for recovery, particularly in very severe cases. Much of the insulin so injected is undoubtedly wasted by its excretion in the urine, but by the time this insulin is losing its effectiveness, the action of the unmodified insulin injected subcutaneously has begun to manifest itself, and by the time this insulin is losing its effectiveness the protamine zinc insulin has begun to manifest itself.

3. A third advantage of this method of treatment is that the administered carbohydrates enhance the storage of glycogen and thus rapidly reduce the degree of ketosis, decrease the tendency towards further ketosis, and thus decrease the tendency to revert towards acidosis. As is well known, in the past, though recovery from the coma was complete, judging from the normal blood sugar and urine free of sugar, acetone in the breath was a common finding as long as 24 hours after the recovery; whereas, as the accompanying charts show, rapid disappearance of the ketone bodies is one of the characteristic results of this new method of treatment.

4. Finally, the frequent feeding of carbohydrate practically eliminates the possibility of insulin reactions, in spite of the hypoglycæmia which may occur. We have not, as yet, met with reactions, though, at times, the blood sugar was at a low level for many hours.

Parenthetically, it may here be noted that the absence of reactions, in spite of the hypoglycæmia, supports a widely accepted view that the neurological manifestations of insulin hypoglycæmia are not due to lowering of the sugar content of the blood, but to reduction of the sugar content of the brain. The experiences fit in with the occasional findings of practically complete aglycæmia without symptoms in persons whose diets tend towards storage of large quantities of glycogen in the body.

EFFECT OF THE NEW TREATMENT UPON MORTALITY

The best indication of the effectiveness of any given method of treatment for any given disease is the influence of that treatment upon the mortality from that disease, and, as we have shown recently[2] there are a number of variables which must be considered in the interpretation of the mortality from diabetic coma. For quantitative purposes a "severity index" was reported, and the following shows the relationship noted between this index and mortality

Severity index	*Mortality (percentage)*
– 5	0
6 – 10	5.0
11 – 15	19.4
16 – 20	50.0
21+	83.3

By applying this index to the cases treated with the new method it was found that whereas, the expected mortality was 39.6 per cent, because of the severity of the cases (the average severity index was 16.3) the actual mortality was 25 per cent only, and that this percentage does not reflect the possible results with this method is clearly shown by the fact that, as stated, of the four deaths two were of patients who were moribund when they were admitted

TABLE I.

CARBOHYDRATE BALANCES IN DIABETIC COMA

Hospital No.	*Blood Sugar (per cent)*			*Began feeding (Hours after admission)*	*Period of observation (Hours after admission)*	*Carbohydrate Balance*		
	On admission	*Before feeding*	*End of period*			*Intake g.*	*Output g.*	*Utilized g.*
C.3515/37	0.909	0.188	0.111	9	61	835	63	772
C.6581/37	0.172	0.051	0.143	2	22	360	trace	359
C. 20/38	0.434	0.143	0.111	4	44	1120	35	1085
C. 745/38	0.666	0.416	0.086	6	34	355	65	290
C. 890/38	1.110	0.216	0.376	8	22	360	8	352
C.1123/38	0.832	0.256	0.072	6	45	510	16	494
C.1365/38	0.357	0.082	0.095	6	46	620	63	557
C.1989/38	0.357	0.058	0.119	5	47	1040	148	892
C.2089/38	0.644	0.107	0.066	5	42	1305	39	1266
C.2896/38	0.656	0.185	0.061	5	46	1440	61	1379
C.5492/38	0.600	0.111	0.344	5	30	650	78	572
Average	0.612	0.165	0.144	5.5	39.9	781.4	52.4	729.0

to the hospital (3959/37; 1939/38) and one (890/38), in addition to the severity of the coma, had the combination of bilateral otitis media, bilateral pneumonia and bilateral phlebitis.

In Table I are shown the carbohydrate balances in 11 cases in which all of the necessary data for the determination of such balances were available. It will be noted that, though the average blood sugar before treatment was 0.612 per cent, it was reduced to 0.165 per cent during an average period of 5.5 hours, and, in spite of the administration of an average of 781.4 grams of sugar during a period of 34.4 hours the average amount found in the urine was 52.4 grams only; that is, an average of 729.0 grams were retained. That this retention was not artificial but due to utilization either by storage or oxidation is shown in each case by the fact that the blood sugar was definitely lower at the end of the period of observation than at the beginning. In fact, it should be noted that these patients not only utilized the enormous amounts of carbohydrates administered but, in addition, also, utilized either by storage or oxidation appreciable amounts of the excesses which the blood contained prior to treatment. It is of interest to note that, of these 11 cases 3 utilized over 1,000 grams of carbohydrate. In one case (2896/38) the amount utilized was 1,379 grams!

A variety of types of blood sugar time curves were noted in these cases, and a number are reported here to demonstrate the various responses to this method of treatment. They were as follows.

The blood sugar time curve shown in Chart 1 (3515/37) is reproduced from our first report,[1] and it will be noted that, though the blood sugar had decreased from 0.909 per cent to 0.188 per cent in eight hours, there was a secondary rise to 0.270 per cent following institution of the carbohydrate feeding. However, it will be noted that without having discontinued the feeding and without additional insulin the blood sugar returned to the normal level and remained at that level for over 60 hours.

The blood sugar time curve in Chart 2 (2089/38) shows a somewhat similar result, except that the secondary rise, although also slight —blood sugar = 0.222 per cent—occurred after the blood sugar had returned to the perfectly normal level. Again, the blood sugar eventually returned to the normal level, in spite of the continued administration of 45 grams of carbohydrate per hour and without additional insulin. That this secondary rise was not harmful is shown by the fact that the diacetic acid had disappeared from the urine while the sugar content of the blood was still increasing.

The blood sugar time curve in Chart 3 (2896/38) shows a similar experience as in Chart 2, in spite of a much more marked secondary increase of the blood sugar (blood sugar = 0.400 per cent) following institution of the carbohydrate feeding. Here, also, it will be noted that the diacetic acid had disappeared from the urine, in spite of the increasing blood sugar; and here, also the blood sugar returned to the perfectly normal level without having discontinued the carbohydrate feedings and without additional insulin. This, it will be noted, is the case in which 1,379 grams of carbohydrate were utilized during a period of about 41 hours.

The blood sugar time curve shown in Chart 4 (1989/38) shows that in spite of a secondary rise of the blood sugar to a very high level (0.416 per cent) both the acetone and the diacetic acid disappeared from the urine while the blood sugar was still increasing. It will also be noted that, parallel with the disappearance of the ketonuria, there was a progressive increase of the CO_2 combining power of the blood plasma from the low level of 10 volumes per cent to 48 volumes per cent. Again, without having discontinued the feeding of carbohydrates the blood sugar returned to the normal level. When the administration of carbohydrates was discontinued the blood became hypoglycæmic; but with the latter there were no signs nor symptoms suggestive of reactions. This is attributed to the large storage of sugar in the brain tissue due to the carbohydrate feedings.

The purpose of recording these four blood sugar time curves is to demonstrate that the secondary increase of the blood sugar following the carbohydrate feedings with this method of treatment of diabetic coma is not harmful; it does not alter the ultimate course of the coma; recovery is eventually complete without further administration of any insulin.

The blood sugar time curve reported in Chart 5 (20/38) is interesting in that it demonstrates a very rare phenomenon, namely, marked reduction of the CO_2 combining power of the blood plasma not due to acidosis but to hyperventilation. It will be observed that, following institution of the treatment of the coma, the CO_2

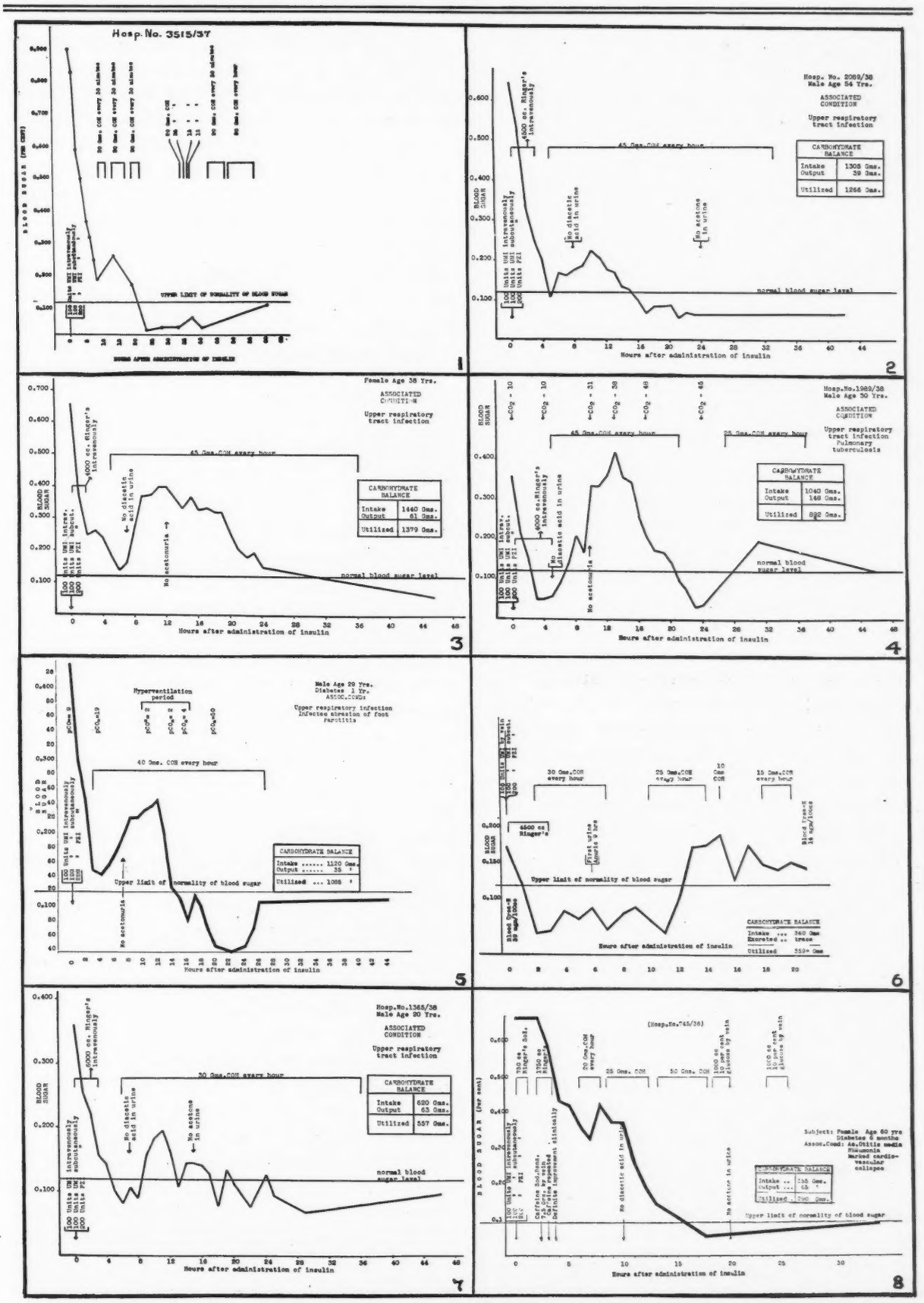

Chart 1.—Blood sugar time curve in a case of diabetic coma following simultaneous administration of unmodified insulin and protamine zinc insulin showing rapid reduction of the blood sugar and prolongation of the action of the insulin in spite of frequent administration of carbohydrates. **Charts 2, 3, 4, 5 and 7.**—Show control of blood sugar in a case of diabetic coma following combined use of unmodified insulin intravenously and unmodified and protamine zinc insulin subcutaneously. **Chart 6.**—Progress in a case of diabetic coma treated by new method. Hospital No. 6561/37. Male aged 20 years. Diabetes 7 years. Persistent vomiting for 24 hours before admission; 220 units insulin (U.M.I.) during 24 hours before admission. On admission: semi-conscious. Marked dehydration. Cardio-vascular collapse.

combining power of the blood plasma had increased from 9 to 19 volumes per cent. Seven hours later, without any known cause, the breathing became very rapid and during this period the CO_2 combining power of the blood plasma had decreased to 2 volumes per cent and ranged between 2 and 4 volumes per cent during a period of, approximately, five hours. With no change of treatment whatever the respirations became normal, and four hours later the CO_2 combining power of the blood plasma had increased to 50 volumes per cent. Here, also, it will be noted that the acetone disappeared from the urine at the time that the blood sugar was actually increasing during the secondary rise following institution of the carbohydrate feedings. Again, in spite of the continued feeding of carbohydrates, the blood sugar returned to the normal level without the aid of additional insulin and was still at the normal level 44 hours later.

Other results not included here, for purpose of brevity, indicate another type of response, namely, a more gradual reduction of the blood sugar with persistent hyperglycæmia for 23 hours. When the carbohydrate feedings were discontinued the blood sugars returned to the normal level. The slow response in this case may have been due to the associated renal damage; the blood urea nitrogen was still 28 mg. per 100 c.c. twenty-one hours after injection of the insulin.

Charts 6 and 7 are recorded to demonstrate the results obtained in the same individual at two different attacks of coma. Chart 6 (6561/37) shows the blood sugar time curve obtained at the first attack. It will be noted that the blood sugar was 0.172 per cent only before treatment. This was due to the fact that the man had taken 220 units of insulin during the 24 hours prior to his admission to the hospital. It should, however, also be noted that, in spite of this previous dosage, we administered the usual 400 units of the combined unmodified and protamine zinc insulin. Parenthetically, it should be noted that there were no hypoglycæmic reactions, though the blood sugar remained at the hypoglycæmic level for 9 hours. That he required all of this insulin is shown by the secondary rise of the blood sugar 11 hours after the injection. The experience with this case affords further proof of the safety of this dosage of insulin with the frequent feedings of carbohydrates. The 400 units of unmodified insulin and protamine zinc insulin were injected without any knowledge of the blood sugar, because of the known safety with the frequent feedings of carbohydrates. In fact, the blood sugars shown in all of the accompanying charts were merely obtained to demonstrate the effectiveness of the combined use of the unmodified insulin and protamine zinc insulin; in no case were they used as a guide to treatment. This case also supports the view that it is not the hypoglycæmia *per se* which causes the reaction, but the reduction of the sugar content of the brain; providing there is a good storage of carbohydrate in the body, reactions do not occur, though the blood sugar may be reduced and kept well below the normal level for hours.

The blood sugar time curve shown in Chart 7 (1365/38) is of interest in that it shows the different response to treatment in the same individual shown in Chart 6.

That this method of treatment may be effective, in spite of the variety of conditions which are known to interfere with the action of insulin and, at times, completely inhibit it, is suggested from two experiences. In one case (890/38), in spite of the bilateral otitis media, bilateral pneumonia, bilateral phlebitis, decubitus ulcer and marked vascular collapse, the blood sugar was reduced from the markedly hyperglycæmic level of 1.110 per cent to 0.216 per cent in eight hours. Here, also, there was a secondary increase of the blood sugar following the institution of carbohydrate feedings, but, instead of awaiting its return to the normal level without further treatment, a second dose of unmodified insulin was given because of the associated conditions. Here, also, however, the blood sugar had commenced to decrease without the additional insulin. This patient recovered completely from the coma, but died subsequently of the associated conditions. As stated, however, the death is included under coma for statistical purposes. That this form of treatment may be effective even in such cases is clearly shown in Chart 8 (745/38) in which is recorded a blood sugar time curve in a case of coma with practically the same complications. It will be noted that, in spite of the otitis media, the pneumonia and the vascular collapse, the blood sugar was eventually reduced from 0.666 per cent to the normal level and kept at that level for over 30 hours. Here, also, the diacetic acid disappeared

from the urine while the blood was still hyperglycæmic.

From our experience to date it would appear that if the above-mentioned dosage of insulin—100 units of unmodified insulin intravenously, 100 units of unmodified insulin subcutaneously and 200 units of protamine zinc insulin subcutaneously—is ineffective subsequent dosages will also be of no effect. Thus, of the four patients who died, two (890/38 and 1939/38) received 600 units and another (3052/38) was given 900 units. However, that it may be necessary at times to give a second injection in spite of the large initial dosage is suggested from another case (5492/38) in which, in spite of the large initial dosage of 400 units, it was considered necessary to administer an additional 200 units of the unmodified insulin 16 hours later.

SUMMARY

A series of blood sugar time curves are recorded to demonstrate the different responses to treatment of diabetic coma with one simultaneous injection of 100 units of unmodified insulin intravenously and 100 units of unmodified insulin and 200 units of protamine zinc insulin subcutaneously.

All of these cases clearly show that there need be no fear of hypoglycæmic reactions when the treatment also includes the frequent feedings of carbohydrates described.

Careful correlation of clinical and laboratory data and comparison with the old method of treatment have shown that recovery is more rapid with the new method and convalescence more satisfactory.

According to the severity index the mortality under this method of treatment is definitely less than with the older methods.

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CONGENITAL ARTERIOVENOUS FISTULA*

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UNTIL relatively recently this condition was completely unrecognized because of the multiplicity of forms in which it manifested itself. The credit for bringing order out of the chaos which was present is due particularly to Lewis[1] and Horton,[2] the latter of whom has improved the diagnostic methods to the point where the pre-operative diagnosis should be absolute. Conditions which we now know to be caused by congenital arteriovenous fistula in the past were known by many names, depending on the size and situation of the lesion. The French literature contains occasional case reports (Radulesco,[3] Yvin,[4] Thomas,[5] Desaive,[6] Dechaume[7]), and as late as 1937 there seemed to be little conception of the underlying cause.

The English literature was also prolific in nomenclature, this having a descriptive rather than a pathological basis. Thus, the variety in the thigh giving enlargement of that extremity associated with visible venous and angiomatous areas was known as hæmangiectatic hypertrophy or Parkes-Weber syndrome.[8] The terms cirsoid and racemose aneuryism were and are still applied to the localized subcutaneous and subfascial varieties; other names such as phlebarteriectasis, Rankenangioma and angioma arteriale are occasionally encountered. This confusion existed despite the fact that Israel[9] in 1877 demonstrated the arteriovenous communications in a leg amputated for an advanced degree of the condition.

This paper is concerned only with the congenital variety of arteriovenous fistula, where the difficulties in diagnosis and treatment are greater than in the acquired variety. The cause of the acquired type is obvious, but that of the congenital is not. In fact the term congenital is used in many of these cases because there is no other reason one can give for the existence of the condition. On the other hand it is likely, for the following reasons, that no other sequence could explain the case—the appearance of the majority of the cases in early childhood, the absence of any traumatic factor, and the fact that the communications between the arteries and veins are multiple instead of single. The fistulæ have probably been present for several

* From the surgical service of Dr. Gavin Miller, Royal Victoria Hospital, Montreal.

years before the development of clinical evidence of their existence, but this time-interval depends entirely on how large the communications are and how rapidly they dilate. The degree of local and general evidence of the disease is also dependent on these conditions. This will explain the development of signs and symptoms of a congenital fistula at the age of fifty or sixty years. The fistulæ previously had been small or non-functioning, and only at this time had opened and functioned, possibly due to overuse of the part or repeated small traumas to the involved area. Reinhoff[10] believes that these fistulæ occur as the result of persistence of vessels or communications of the primary vascular *Anlage* which, failing to develop into the normal vascular tree, results in the formation of imperfect anastomotic channels which connect either directly or circuitously with otherwise normal arteries and veins.

The most interesting variety of congenital arteriovenous fistula is the one which occurs in an extremity, involving the main vessels shortly after they leave the trunk. The results of this shunt high in the limb are altogether different from those when the fistulæ are farther distally. This is well shown in the differences between cases 1 and 3, where in 1 the fistulæ is between the femoral vessels and in 3 involved the sole of the foot. The usual picture in the proximal fistulæ is that of an arm but more commonly a leg which is larger than the normal, both above and below the knee, also demonstrating a generalized rise in skin temperature from 1 to 3° C. Usually enlarged, dilated or frankly varicose veins are present; there may be nævoid angiomatous patches and pigmentation. Ulceration may be present, identical with a typical varicose ulcer, except that its position is not constant. An increase in the length of the leg only occurs when the condition is well defined before the closure of the epiphyses, and may result from the generalized increased vascularity, giving a better blood supply to the epiphyseal lines. However some other factor than this, possibly the actual increase in temperature alone, must be operating, because limb sympathectomy followed by the generalized vasodilatation does not result in increased growth of the immature extremity.[11] The lengthened extremity if unrecognized for some time results in a lifting of the pelvis on that side, followed by a compensatory scoliosis.

Another serious remote result of a well developed fistula is the cardiac damage produced. This effect has been emphasized by Reid[12, 13] in several excellent articles. This damage is caused by cardiac overwork which must necessarily follow the changed physiological conditions incident to the fistulæ. The systolic blood pressure in the artery is lowered because of the lowered resistance due to the arteriovenous openings; the wall is thinned and the lumen is increased. This is known as "venification" of the artery. Because of the lowered systolic pressure an increased amount of blood comes to the involved artery. This is shunted in greater or lesser degree directly to the vein, causing an increase in the venous pressure. This produces thickening of the wall of the vein with an increase of the elastic and muscle elements, known as "arterization". Thus the blood is returned to the heart sooner than it should be, and the heart must increase its rate and stroke volume to take care of it. Cardiac decompensation is the end-result, but this can be relieved by operative cure of the fistulæ. One of the diagnostic tests, known as Bragman's sign, has its basis on this changed vascular physiology. This test is not present in all, but is positive when the cardiac rate drops 10 to 20 beats per minute after closing off the artery proximal to the fistula. The effect is probably due to the sudden rise in blood pressure which follows blocking off the fistula. This rise either reflexly or directly stimulates the cardio-inhibitory centre of the brain via the sinus reflex.

CASE 1

G.S., a female, aged 15, was admitted to the Royal Victoria Hospital on January 28, 1939.

Her history revealed a leg enlargement on the left side for about nine months. The only symptoms referable to the affected leg were some heaviness and tiredness after being on her feet all day. There was no history of trauma, phlebitis or lymphangitis.

Examination revealed the left leg to be uniformly enlarged from the foot to the groin (see Fig. 1). The thigh was 1½ inches greater in circumference and the calf 2½ inches. The length of both legs was the same, at 34 inches. There was no evidence of hypertrophy in other parts of the body. Examination of the circulation revealed absent pulsations of the dorsalis pedis and posterior tibial arteries in both feet. (This was considered to be an anatomical abnormality). The popliteal pulsation was normal on both sides. There was increased warmth of the entire left leg, varying from 1 to 2.5° C. as measured by the dermatherm. The vaso-dilatation response after spinal anæsthesia approximately equalized the temperatures of the two extremities, the response being slightly greater on the right than on the left. No bruit was present; the blood pressure in the legs was, right 134/80; left 128/78. Bragman's sign was negative. The histamine flare test showed a more marked re-

sponse on the affected side. There were numerous small visible cutaneous and subcutaneous veins on the left side which were not present on the right. These were more visible on photographing with infra-red rays (Fig. 2). The arteriogram, using thorotrast, was made after the technique suggested by Horton and Craig[11] and demonstrated two fistulæ between the femoral vessels in Hunter's canal (Fig. 3). A venogram taken following the injection of hippuran into the great saphenous vein at the level of the ankle showed a reduplication of the great saphenous vein but no undue enlargement or tortuosity of the veins (Fig. 4).

Urine, negative. Hæmogram, negative, except for some lymphocytosis. Basal metabolic rate −20. The blood Wassermann test and Kahn 4+ which qualitatively became zero at a dilution of 0.025 per cent. The cerebrospinal fluid Wassermann test was negative. She had an intact hymen and the pelvic organs were normal. The blood reactions of the mother and father were negative.

X-rays of the bones of the left leg showed them to be the same in size and length as the right. The epiphyses were closed. Soft tissue x-ray showed the hypertrophy to be generalized rather than localized to any particular stratum. Although she was a large

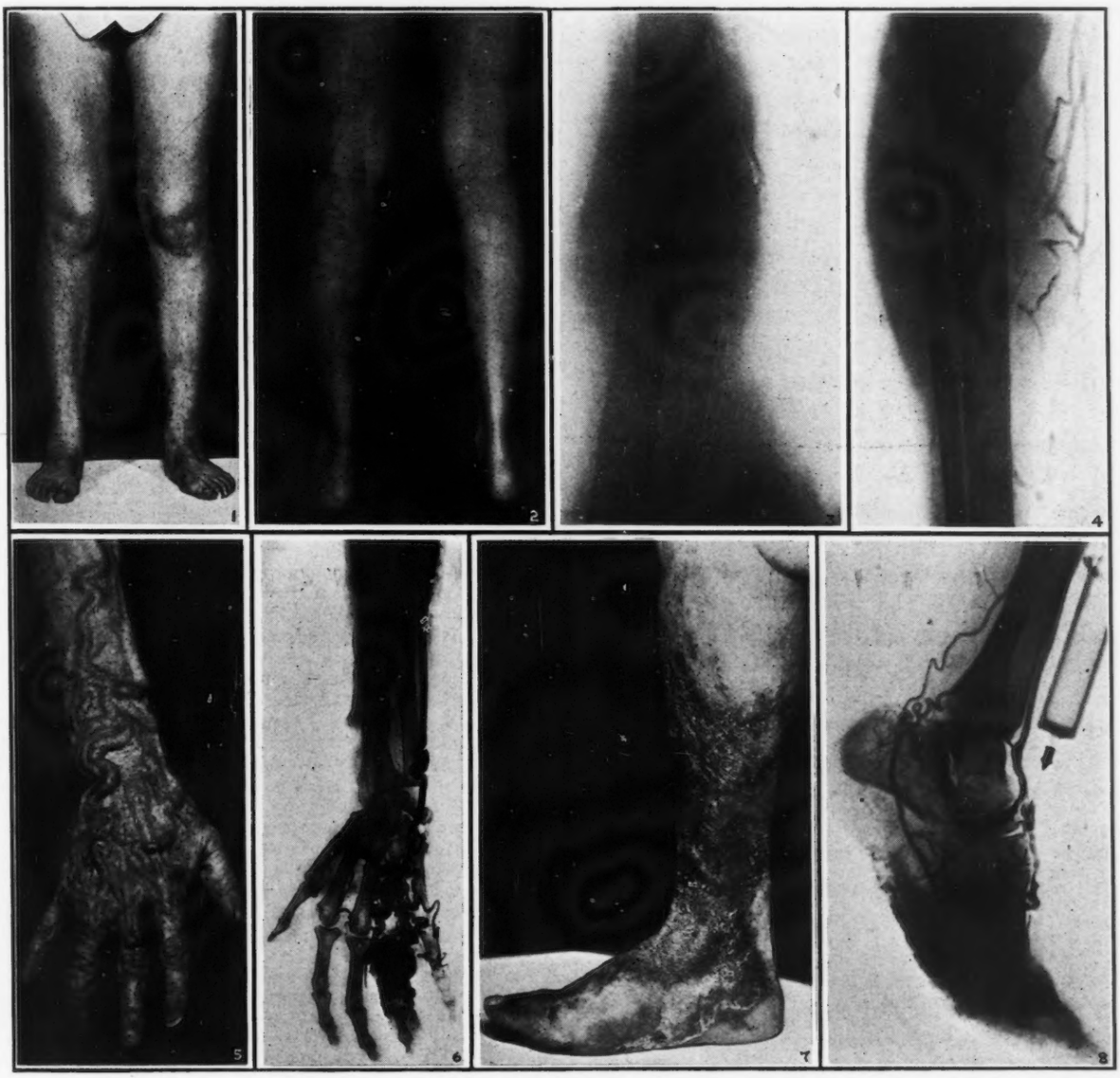

Fig. 1. Case G.S.—Congenital arteriovenous fistulæ between the left femoral artery and vein. **Fig. 2.** Case G.S.—Infra-red photograph demonstrating the increase in the superficial venous channels in the involved left leg. Note the generalized enlargement of the left leg. **Fig. 3.** Case G.S.—Arteriogram using thorotrast injected into the femoral artery at the level of the inguinal ligament, and demonstrating two fistulæ between the artery and vein in Hunter's canal. **Fig. 4.** Case G.S.—Venogram using Hippuran injected at the level of the ankle, showing re-duplication of the great saphenous system. **Fig. 5.** Case M.H.—Congenital arteriovenous fistulæ present in the palm and right fourth finger. Note the marked venous dilatation associated. **Fig. 6.** Case M.H.—Arteriogram injected into the brachial artery at the level of the elbow, showing marked enlargement of the radial and ulnar artery and fistulous mass in the finger and palm. **Fig. 7.** Case E.G.—Congenital arteriovenous fistulæ present in the sole of the right foot. Note the signs of superficial skin malnutrition and the obliteration of the concavity of the sole. **Fig. 8.** Case E.G.—Arteriogram of the involved foot demonstrating the huge mass of fistulous connections and the tremendous dilatation of the arteries of the foot.

girl for her age it was the opinion of Dr. J. S. L. Browne that she showed no definite individual glandular dyscrasia. The electrocardiogram was normal, and clinical examination of the heart revealed no evidence of enlargement.

No treatment has been carried out regarding the fistulæ because of the development of a massive left pulmonary embolus four days after the venography. Several subsequent smaller emboli made imperative the exploration of the left sapheno-femoral junction, whence was removed a large organized thrombus extending proximally into the external iliac vein. The femoral vein was ligated at the saphenous level. No further emboli resulted and the patient was discharged on April 1, 1939.

Discussion.—This case apparently is one which has developed recently, because the legs are equal in length, and there are none of the later signs of large superficial veins, bruit, Bragman's sign or angiomatous patches. The differential diagnosis is interesting because it really amounts to all the causes which result in a swollen leg. These can be divided into two main groups: (*a*) those with œdema; (*b*) those without œdema. The group with œdema can be proved by the presence of pitting œdema or lesser degrees can be discovered by the reduction in the size of the leg after recumbency in bed for several days. This group does not concern us here. In case 1, bed rest for two weeks made no difference to the size of the leg. In those cases not due to œdema, there are two main conditions concerned, congenital hypertrophy, and arteriovenous communications. Congenital hypertrophy is present in all of us in varying degrees, but in most not sufficiently obvious to be remarkable, a fact which is miraculous considering the infinite possibilities for abnormalities in growth. Bragman[15] quotes four different types of congenital hypertrophy: (1) true total hemihypertrophy; (2) partial hemihypertrophy affecting one extremity; (3) crossed hemihypertrophy; (4) localized hemihypertrophy affecting only one organ. Wakefield and Hines[16] have collected 223 cases of congenital hypertrophy from the literature, but a close examination of the series will reveal that many of them resemble our case, and so are arteriovenous fistulæ and not true congenital hypertrophy. Also in the true congenital hypertrophy there are usually other congenital stigmata, especially mental deficiency.

CASE 2

M.H., a female, aged 68, was admitted to the Royal Victoria Hospital on March 15, 1939. Her admission was due primarily to large bowel obstruction caused by an inoperable carcinoma of the sigmoid. She gave a history of having had, since the age of two, a vascular tumour and enlarged veins involving the fourth right finger, dorsum of the hand and forearm, associated with pulsation.

Examination showed marked involvement of the right fourth finger and contiguous area of the palm by a mass of thin-walled bluish vessels which had displaced the soft tissues, allowing accurate palpation of the phalanges when the blood was expressed. There was a coarse bruit over the palm, and the veins on the dorsum of the hand and the entire forearm were large and tortuous (Fig. 5). Pulsation could be seen in those veins closest to the fistulæ. The entire arm and forearm were considerably warmer than the left, averaging 2° C. at the various points. The radial and ulnar arteries were much enlarged, visible and pulsating. Bragman's sign was negative.

On the second day after the operation of colostomy she developed a markedly accelerated cardiac rhythm associated with cyanosis and shortness of breath. The electrocardiogram revealed a 2:1 heart block, with an auricular rate of 336 beats per minute and a ventricular rate of half that amount. She had a history of cardiac irregularity thirty years ago for which she was kept in bed one year.

The arteriogram (Fig. 6) showed marked increase in size of both radial and ulnar arteries, with tortuosity. There was an extensive degree of arteriovenous communications in and at the base of the 4th finger. No treatment was indicated in this case.

CASE 3

E.G., a male, aged 50, was admitted to the Royal Victoria Hospital on March 7, 1939.

His history revealed an enlargement of the right foot since childhood but more marked in the past three years. He had had enlarged veins on the right lower leg for the past twenty-five years, associated with increasing pigmentation and the periodic appearance of an ulcer on the medial side of the sole of his foot. His complaints were tiredness and weight in that foot, and recently quite severe pain in the sole of the foot, especially when it was dependent.

Examination revealed a swollen pigmented foot with dilated superficial veins (Fig. 7). The sole was convex instead of concave, and pulsated markedly. A loud bruit was present over the dorsum of the foot. The dorsalis pedis and posterior tibial arteries were much enlarged and pulsating strongly. Bragman's sign was positive following obliteration of the dorsalis pedis artery, the pulse slowing twelve beats per minute.

The foot and lower leg showed a marked increase in warmth, the degree being about the same as in the other cases. The arteriogram shows the arteries (Fig. 8) to be hugely dilated, and the presence of a large mass of intercommunications in the sole of the foot.

The blood Wassermann test was negative. There was no evidence of cardiac damage or enlargement.

Ligation of the dorsalis pedis artery was done between the lateral malleolar and the lateral tarsal branches. This procedure eliminated the bruit, but only lessened the pulsation in the sole of the foot. One week later ligation of the posterior tibial artery was done proximal to the medial calcaneal branch. The sole of the foot became immediately softer, the pulsation disappeared and the symptoms were relieved. Ecchymosis developed at the bases of the toes, which looked for a few days to be on the verge of gangrene. The patient was discharged on March 29th and has since returned to work.

CONCLUSIONS

1. There is confusion regarding the many vascular conditions which result from a single cause, namely, congenital arteriovenous fistula.

2. The manifestations are many, ranging from that of a glomus tumour beneath the finger nail to a circoid collection on the scalp, and a symptomless enlarged extremity.

3. Emphasis is laid on the results of a fistula between the femoral vessels, and an early case is presented in detail.

4. Two other cases, one in the hand and one in the foot are presented.

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PARATHORMONE SHOCK-TREATMENT IN POST-OPERATIVE TETANY*

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IN presenting this material we summarize a long manuscript yet to be published which deals with certain problems of calcium metabolism as exhibited in the life-history of one patient and of several other members of her family through three generations. We deal here only with one special episode referred to in that manuscript.

This report concerns a female, under observation for forty years, who had a recognized disability over a period of fifteen years and who has been under treatment by one of us. She is now forty-seven years of age and unmarried.

CASE REPORT

Within forty-eight hours after the removal of her goitre on December 5, 1924, the patient was having severe tetany seizures with convulsions. Large doses of calcium chloride and the commercial extract of parathyroid were given by mouth without avail. Intravenous calcium chloride and the administration of chloroform-ether mixture, morphine hypodermically, and other sedatives were necessary. At that time Dr. J. B. Collip gave us the first opportunity to use his extract on the human subject, but our blood calcium reports failed to justify our accepting the offer at that stage. The woman gradually recovered while in hospital, but a long febrile illness delayed her discharge until after she had been four months there (Chart 1).

She was given a diet high in calcium and low in phosphorus. Blood-chemical tests for calcium were all reported high. Medical supervision was dispensed with at the end of a further period of five months, and she continued to be fairly well for seven years without further direction.

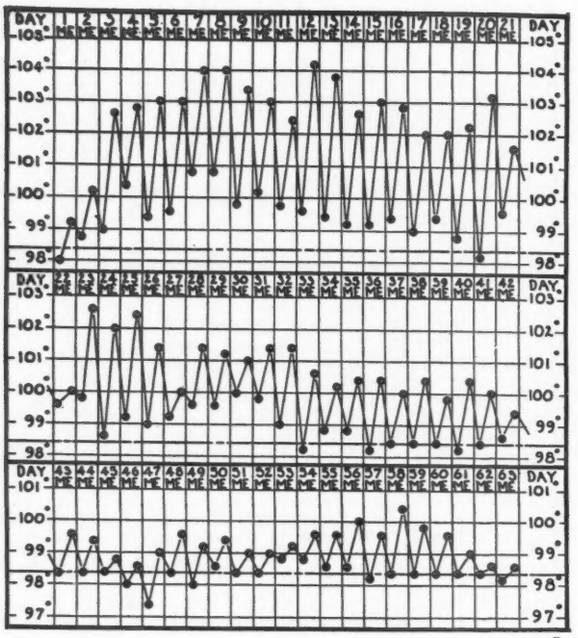
Under a little pressure she again came under observation in July, 1932. A blood test revealed calcium 7.0 mg. and phosphorus 3.7. One month later, while taking the blood in the office, hyperventilation precipitated a return of the tetany seizures and convulsions. That test was later reported, calcium 5.5. She was again admitted to the hospital. On the following day, in addition to other treatment, the administration of parathormone was begun (Chart 2).

During a few days following, and again with the use of ether during seizures and of other sedatives during the day, her condition improved. The number of seizures fell from sixteen daily to four. She menstruated and the number rose to thirteen for one day, and then dropped to three. The weather suddenly turned excessively hot. This evidently produced a very serious effect. She rapidly became worse, with many seizures in the day, and the clinical picture appeared to be desperate. At that time we began to give some consideration to a previously recorded observation in the use of insulin. This observation was made by one of us while treating a diabetic who had been under observation and treatment with insulin for many months. After two long periods of shock, one of which lasted thirty and another twenty-four hours, we observed that that patient required less insulin. Although this has since also been observed by others we have never received any satisfactory explanation of this effect. Nevertheless, it then occurred to us that some unknown factor might prevail, and that, likewise, "shock-treatment", through the use of parathormone, might be justified.

Before proceeding with such a clinical experiment we consulted others more familiar with the chemistry of various calcium drugs and their metabolism, as it was then known. We reviewed with them the observations just referred to. We also reviewed personal information given to us by Dr. Collip, in which he pointed out the dangers of pyramiding. We were advised by them that the experiment to be described below might be safely carried out, but that the amount should not be increased and that the total daily dosage, namely, sixty units, which had been given in three doses, should be divided into four doses with a fifteen-hour gap at night in order that we might be able to recognize the early stages of shock, in daylight.

That change in dosage was made on September 8th. For two days there were convulsions and the

* A paper prepared for presentation at the Annual Meeting of the Ontario Medical Association, June 1, 1939.



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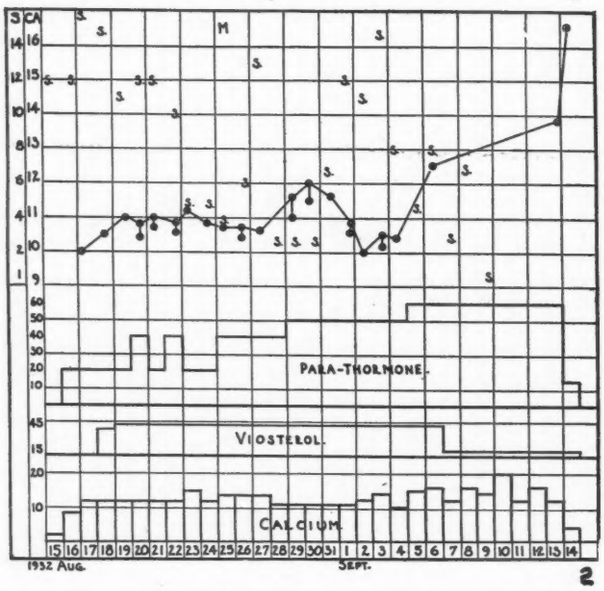

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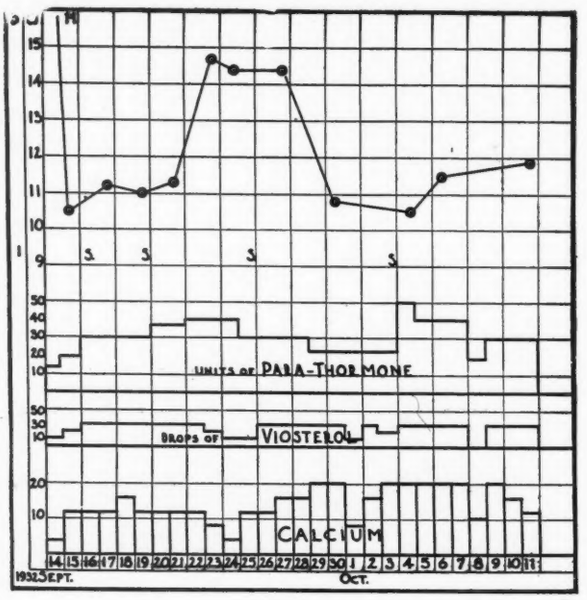
twitching, pain in the abdomen, weeping, and talking irrationally. On September 10th the twitching was less severe and there were no convulsions. The following day the twitching was still less severe but the pain in the abdomen continued, and the patient talked irrationally. On September 13th the nurse's morning report was that she had had a good night's sleep, but it was found later in the day that she was difficult to arouse. It was hard to make her drink or take food. It was also then reported that after coughing the lips were blue. When the blood calcium later was found to be 14.9 mg., an order was given to reduce the dosage the following day to fifty units.

During the night the patient was reported as sleeping most of the time, although she had voided twice in small amounts. She had refused to drink or take any nourishment. On the morning following she was given at 8 a.m. her first dose of calcium, viosterol and parathormone, fifteen units. Blood was taken for a calcium test at 9 a.m. About half an hour later her finger-tips and lips were cyanosed. Certain muscles of the extremities when tested were flaccid and she was almost completely unconscious. We estimated that she had proceeded far enough into the coma-stage and immediately undertook certain steps to correct it. The blood calcium was later reported as 16.7 (Chart 3).

Space will not permit a recitation of the procedures adopted, other than to state that they were successful, and she was clearly out of her "shock-stage" at 9. p.m. Subsequent to this, with the exception of four mild and one more severe, there were no more seizures with convulsions. It was soon possible to eliminate the use of any sedatives. The dose of parathormone was gradually reduced, and ultimately from 60 to 15 units daily. There was no loss in its efficiency as so frequently reported by others (Charts 4, 5, 6 and 7).

More recently we felt that her own glands might have been able to produce a larger share of that necessary hormone. Had we been able to estimate this, it might have been possible during that latter portion



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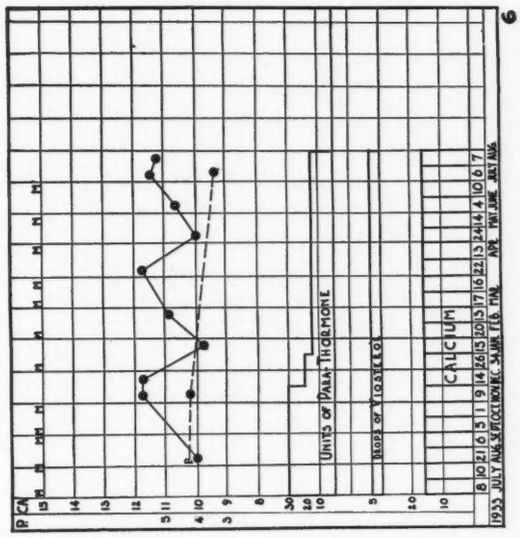
of this six-year period to still further reduce the dose of the extract.

We did not believe that it was in her interest to take any chance on a repetition of the relapse which occurred in 1932. An occasional drop in the calcium satisfied us that we should carry on, even if she were mobilizing and wasting much calcium. She appeared to be able to lead a normal life in her domestic environment, and was admittedly in better health than she was before her operation.

On June 20, 1938, dihydrotachysterol, known as "A.T.10", was made available to us. No other change was made in previous orders, and this A.T.10, was added in 0.5 c.c. doses given twice a week and the blood calcium was estimated at weekly intervals. On September 19th she had taken her last dose of A.T.10, of the supply available. When the blood calcium, taken three days later, was reported on September 24th 14.4, the parathormone was stopped until a later test could be made and was then given for five days and then discontinued. Later, a fresh supply of A.T.10 became available and was given, as before, without other change in regard to the viosterol and calcium (Chart 8).

When a high report of the blood test on December 22nd (calcium 14) reached us, all medication was stopped for eight weeks. In reviewing these last two stages it would appear that during the period that parathormone was given there was at first a tendency for her to mobilize and probably waste calcium. Later, there was a gradual disposition for the blood curve to rise. She had eventually piled up a considerable storage. We did not know how long it would take for that storage to be exhausted (Chart 9).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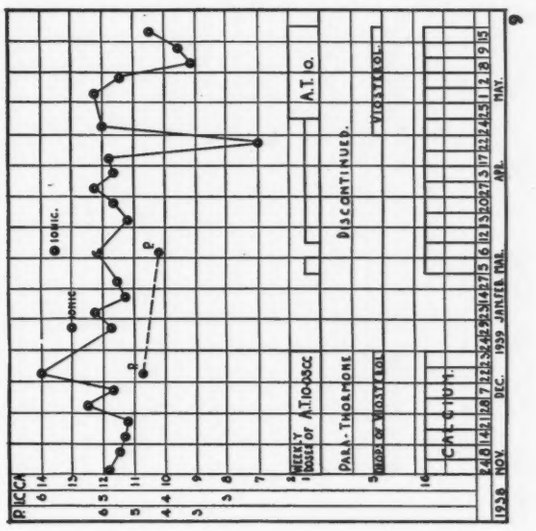
CALCIUM
UNITS OF PARA-THORMONE
DROPS OF VIOSTEROL
1933 JULY AUG. SEPT. OCT. NOV. DEC. JAN. FEB. MAR. APR. MAY JUNE JULY AUG.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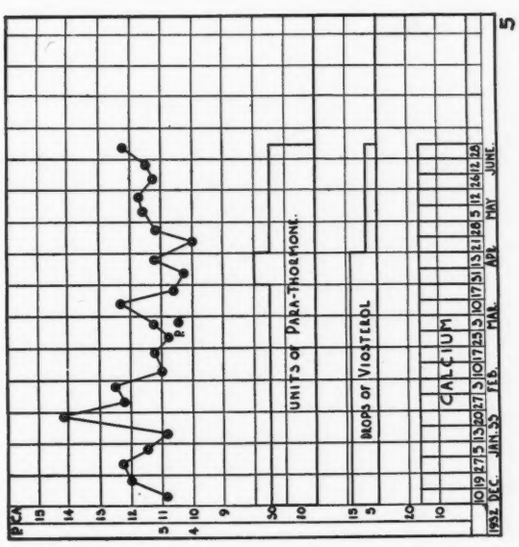
IONIC.
A.T.10.
DISCONTINUED.
CALCIUM.
1938. NOV. DEC. 1939. JAN. FEB. MAR. APR. MAY.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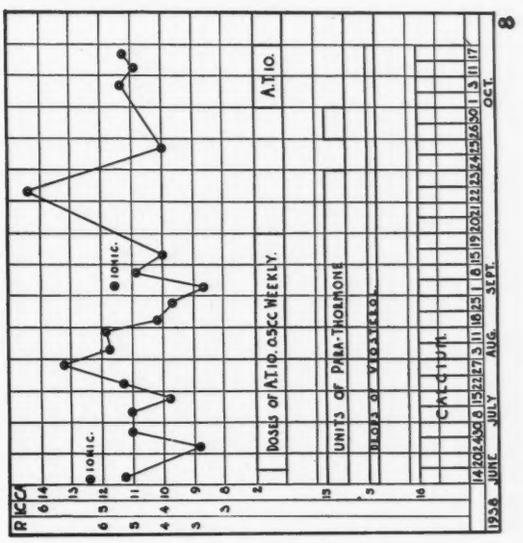
CALCIUM
UNITS OF PARA-THORMONE
DROPS OF VIOSTEROL
1932. DEC. JAN. 33 FEB. MAR. APR. MAY JUNE.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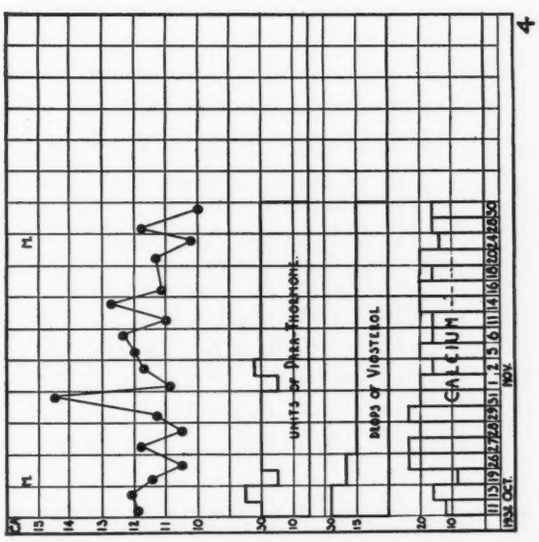
IONIC.
DOSES OF A.T.10. 0.5CC WEEKLY.
A.T.10.
UNITS OF PARA-THORMONE
DROPS OF VIOSTEROL
CALCIUM.
1938. JUNE JULY AUG. SEPT. OCT.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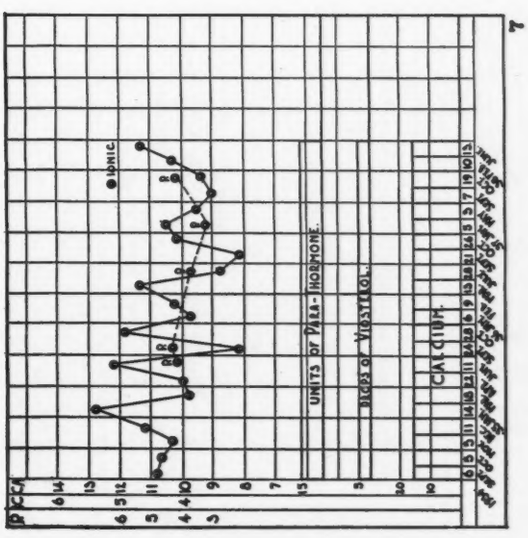
CALCIUM
UNITS OF PARA-THORMONE
DROPS OF VIOSTEROL
1932 OCT. NOV.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IONIC.
UNITS OF PARA-THORMONE
DROPS OF VIOSTEROL
CALCIUM.

On March 5th the patient was instructed to continue with one dose weekly, and for a short time was apparently under excellent control. On April 21st she told me that she was under the impression that this new drug did not hold her continuously, as parathormone did, as she had noticed that before the end of the week she became "jittery" and could not properly focus her eyes. A blood test the following day showed calcium 7.0, which evidently explained her symptoms. She took her dose late the next day and the blood on the following morning was again back to the previous high level, calcium 12. She was then told to take five drops of viosterol daily and two doses of A.T.10 each week. Although she menstruated her blood calcium records at the end of the week still remained high the day before and after her second dose. The following week she was not quite so well and blood records were lower. Whether or not we will again have to return to parathormone time only will tell.

We do not yet know how to explain the so-called "increased sensitivity" to insulin, nevertheless we were of the opinion (and still are), that it was in the interest of our patient to endeavour to find out whether or not she would show the same type of effect with the use of parathormone extract. It had been agreed by many who saw her during the episode in 1932 that this experience did produce a dramatic effect. The modus operandi has been suggested but admittedly not yet clearly revealed.

It must frankly be admitted that we have no desire to meet such a contingency again or, if we do, to repeat that experiment. We hope that it will be possible to control this patient without another relapse. We still believe, as we believed then, that we were justified in carrying out this piece of work at that time in view of the desperate clinical picture presented.

In view of the grave risks, unexpectedly revealed during the progress of this experiment, and in spite of our attitude regarding our own case, we are willing to join with others and strongly condemn any repetition of the experiment for general use until such time as many features of this problem have been properly investigated by animal experimentation. We also join with others who would condemn uncontrolled procedures now being recommended in the use of massive doses of certain vitamin D stuffs, as a few deaths have already been reported.

When parathormone was made available to the profession by Dr. Collip it was believed that its field of usefulness would be very small, and that the development of plans for treatment would be limited by the rarity of the opportunity for its use by the trial and error method. Recently, however, we have come to believe that this field may be enlarged by the probable inclusion in it, not merely of well defined cases of post-operative tetany but also many exhibiting milder degrees of parathyroid deficiency.

Some may ask why we have dared to present this material at this time. In answer we merely state that we believe that in this study we have had a rare opportunity to observe the effect of parathormone. We hope that we may yet stimulate others to carry on other investigations in the use of that extract and as well of the newer powerful drugs containing vitamin D. We believe there is an urgent necessity for a wide distribution of more accurate information regarding calcium metabolism, including reliable methods for clinical and laboratory investigation and direction for treatment in all grades of calcium deficiency. We must look forward to the day when others will teach us not only how to recognize minor grades of parathyroid deficiency but also how best to supplement the efforts of these glands when they are handicapped by surgical procedures or other causes.

Quite recently one of us, in an effort to refresh his mind regarding the early history of the patient reported here, interviewed her mother a bright young-acting woman, of some seventy-five years. She told him that our patient was the last of three babies born within two years, and that after that confinement her own teeth went to pieces very rapidly. She said, "From what we know now it appears to me that that baby was not given enough calcium to start with, and probably did not have the right kind of machinery to use it". We believe it is not unlikely that, in that statement, she came pretty close to the truth. It is altogether likely that our records of this case definitely indicate that she had a congenital deficiency. It may be that there are many others similar to our patient who have not yet been operated on and who have thus far not been recognized. In the future such recognition should be more readily attainable, and this not only in regard to the problem which we have presented but also in other conditions in which hormones are necessary for our normal body activities.

N.B. — Dihydrotachysterol — A.T.10, referred to in this paper was supplied by Winthrop Chemical Company, Inc., Windsor, Ont.

DYSMENORRHŒA*

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DURING recent years much has been learned regarding uterine physiology. Knowledge regarding the cause of menstrual pain has likewise increased, but no such advance has occurred in the treatment of dysmenorrhœa. Comprehensive discussion of remedial therapy would lead us far beyond the space and time restrictions placed upon this paper. Consequently we shall limit this discussion to those cases revealing no gross pelvic or general constitutional disease. I would not minimize other causes of pain, however, for even under the best of circumstances the cure of dysmenorrhœa remains a worthy test for the keenest medical minds. Perhaps better treatment may be expected when the medical profession in general recognizes that dysmenorrhœa is often an incapacitating illness, quite as important as many other diseases. Dysmenorrhœa is a major problem, and as such, it is desirable that persons undertaking treatment be qualified to do so. Physicians should be armed with a comprehensive background of fundamental knowledge including uterine physiology and pathology if they wish to avoid common therapeutic pitfalls. Such information is readily available in the texts and medical journals of today. Improved results will amply reward the physician who prepares for the treatment of dysmenorrhœa as he would for any other important medical problem.

Incidence and significance.—Probably 45 per cent of all menstruating women suffer some discomfort at the time of flow. Less than half of this number, about 15 to 20 per cent, are seriously inconvenienced or incapacitated. The significance of this statement, however, cannot be fully appreciated without further analysis. Let us be conservative and say that among this number the average duration of incapacity is one hour per patient per period. What does this mean by way of economic loss? What does it mean in hours of suffering among Canadian women? Without claiming absolute accuracy, let us look at the 1931 census figure and we find that the population of Canada for that year was 10,376,786, or roughly ten and one-half million. Of this number, slightly less than one-half were females, say 5,000,000. Twenty-one per cent of this number should be in the menstrual age, *i.e.*, 15 to 40, or 1,050,000, of which number 17 per cent suffer, let us say, one hour's incapacity at each period. By simple mathematics the total time lost or spent in suffering annually by this 17 per cent is found to be 8,825 days, or 24 patient-years per chronologic year. Quite a respectable figure any way one looks at it, and just another reason for emphasizing dysmenorrhœa as a medical problem.

Classification.—For convenience in discussion some classification of dysmenorrhœa is desirable, but since no grouping is entirely satisfactory it becomes necessary to rely on descriptive terms which through long usage have come to have a significant meaning. Two principal groups are commonly considered, (1) cases where the discomfort begins with or shortly after the onset of menses, the so-called "primary", "essential" or "pubertal" type of dysmenorrhœa. When the discomfort begins later in life, (2) the term "secondary" or "acquired" is often used. The implication of later onset in the term secondary probably justifies its continued use, but the older connotation of secondary origin now seems superfluous since all dysmenorrhœa is secondary.

Most dysmenorrhœa developing early in life is characterized by a crampy type of pain. This has led to a common association of the terms primary (essential) and spasmodic or spastic. Similarly since dysmenorrhœa coming on later in life is frequently characterized by a steady ache, the association of such terms as secondary (acquired) and steady ache or *congestive* is customary. Doubtless it is desirable to classify dysmenorrhœa on the basis of etiology when known, but when the cause is unknown the descriptive terms mentioned above may be used. Obviously, there may be more than one etiological factor, and likewise both steady ache and

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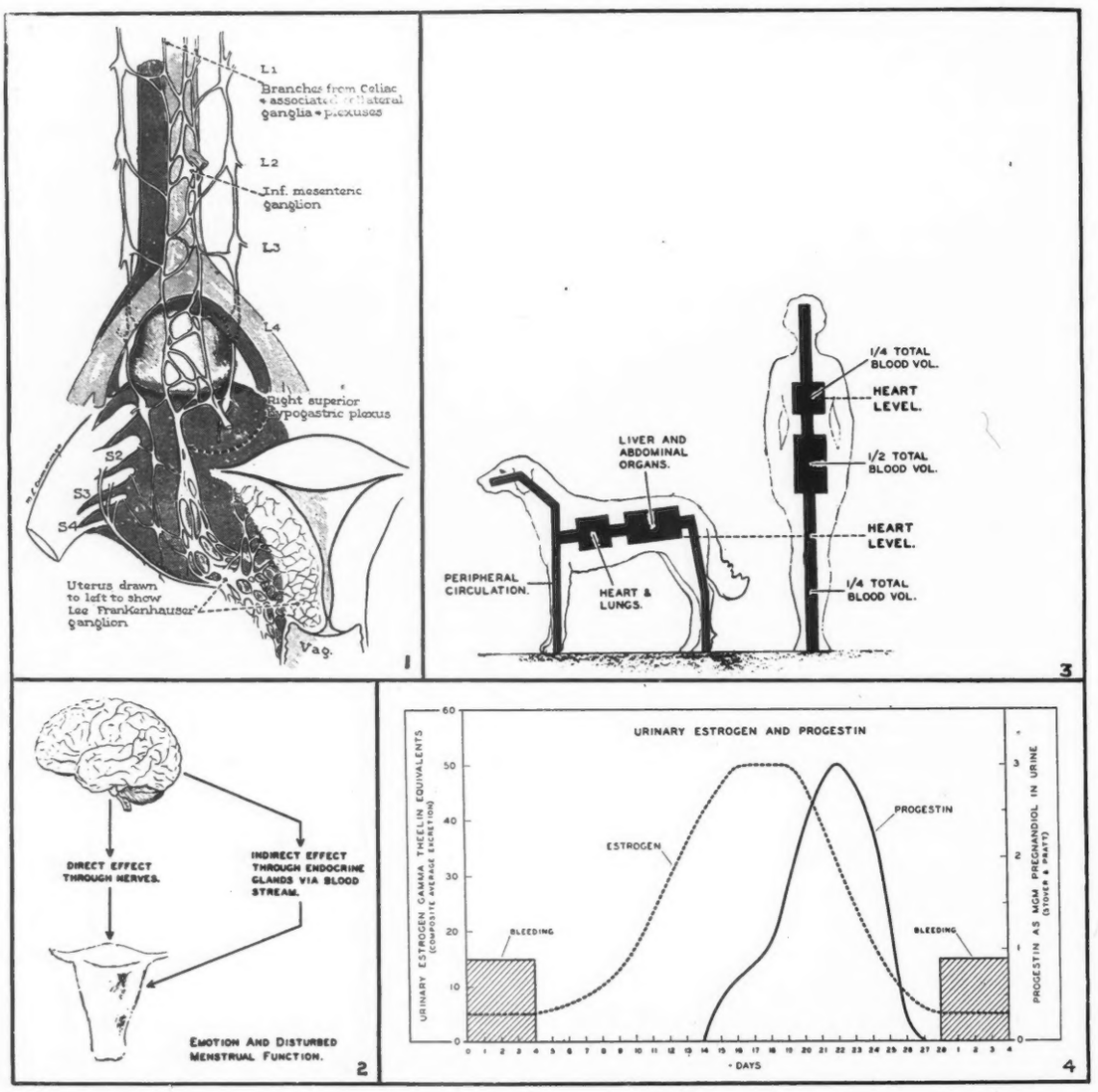
spasmodic pain may be present in any one person. The picture is sometimes further complicated by general constitutional symptoms, such as nausea, vomiting, etc., included under the term "constitutional dysmenorrhœa". Certainly, if there be anything consistent about dysmenorrhœa it is its inconsistency, of which a great deal could be said.

Basis for management.—The best approach to the treatment of dysmenorrhœa is through an understanding of the fundamental physiology and anatomy of the structures involved. Specifically, this includes the nervous, vascular and endocrine systems. Time and space do not permit a complete review of these fundamental subjects, but the brief consideration here presented may prove helpful as a basis for understanding the mechanism of dysmenorrhœa in most individuals.

Nerves to the uterus.—While there exists some difference of opinion regarding the nerve supply to the uterus most observers agree that this occurs chiefly by way of the sympathetics and para-sympathetics. The course of these nerves is diagrammatically shown in Fig. 1. According to Davis[1] the fibres are distributed to the uterine capillaries. While the uterus appears to function satisfactorily even when its major nerve supply has been cut, the presence of an intact nervous system permits an explanation for the important relationship between menstrual disorders and emotional disturbances. Just how this is brought about may not be entirely clear. Whether the effect of the emotions be through the nervous system upon the vessels and/or muscle of the uterus, or indirectly by influencing the activity of the glands of internal secretion, is unknown (Fig. 2). However, familiarity with



the nerve supply of the uterus is important, for it permits a fuller understanding of the part which may be played by the emotions on the functioning of the pelvic organs. It is well to think of the human body as a well integrated unit. Dysfunction of any organ must of necessity affect every other organ. This effect upon other organs may be trivial or considerable. Certainly, the everyday examples of emotional influences upon body function are so numerous as to leave no doubt regarding the possibility of there also being an important relationship between dysmenorrhœa and the emotions. One need only recall the blush of youth, the nervous indigestion, tachycardia, sweating, urinary urgency of nervous stress, to recognize that each day presents numerous examples of bodily function influenced by the mind. Probably all women at one time or another feel the influence of emotional stress in the form of altered menstrual physiology. As a contributory or predisposing factor in dysmenorrhœa the emotional element therefore, must never be overlooked.

The nerve supply to the uterus may be a significant factor in influencing the character of uterine function in another way. As pointed out by Davis,[1] we accept pathological change in nerve fibres and ganglion cells as accounting for dysfunction in other parts of the body, so it is only reasonable that a similar cause and effect relationship may exist between uterine function and the nerves supplying this organ. Actual inflammatory and/or degenerative changes of the ganglion cells and nerve fibres could be responsible for altered uterine function. Study of pre-sacral nerve sections obtained by neurectomy for dysmenorrhœa revealed pathological alteration in a surprisingly high percentage of Davis' cases. Uterine function then may be influenced in several ways, by way of the sympathetics as a result of emotional upset or as a result of nerve disturbance secondary to actual disease of the sympathetic nervous system.

Much has been made of the Lee-Frankenhauser ganglion located lateral to the uterus in the broad ligaments. If these ganglia are headquarters for motor and possibly sensory impulses to and from the uterus it is conceivable that pelvic disease, whether inflammatory or otherwise, by affecting these ganglia, might also cause altered uterine function.

Even from the brief description of uterine nerve supply here presented and the influence of disturbed emotion upon uterine function it should be clear that a carefully taken history is an important step in the treatment of dysmenorrhœa. This need not be in the form of prolonged psychoanalysis but it should be adequate. Since all physicians are by no means good historians considerable care and thought should be given to this aspect of the study. The discovery that psychogenic factors play an important part in causing dysmenorrhœa does not warrant abrupt disclosure of this fact to the patient. Here as elsewhere judgment and prudence are desirable.

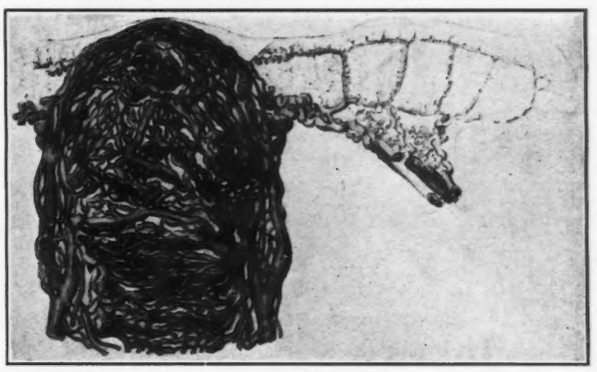


Fig. 5

Blood supply.—The blood supply to the pelvic organs is important, and as an anatomical basis for dysmenorrhœa deserves careful consideration. The many venous plexuses of the uterus, bladder, rectum and ovary are closely related and form a tremendous pelvic venous network. Interestingly enough, these veins and the larger veins into which they empty are devoid of valves. Further, except for the uterine veins, the pelvic veins derive their support largely from intra-abdominal pressure maintained by satisfactory muscle tonus. In the quadruped these factors are unimportant but in the biped they may become significant (Fig. 3). Where muscular and vascular tonus is satisfactory and circulation adequately maintained by physical activity no abnormal congestion occurs. But when these factors are altered as by fatigue, exhaustion, malnutrition or sedentary habits, congestion occurs, and this stasis may play an important part in the causation of congestive dysmenorrhœa. One need only recall the classical experiment whereby a rabbit is made to bleed to death into its own venous cistern without actually losing a drop of blood, simply by maintaining it in an erect position, to realize

how important this vast venous plexus may become (Fig. 5).

Evidence of abnormal strain on the pelvic vascular system may be seen as varicosities of the lower extremities. Since the leg veins are supplied with valves and supported by neighbouring muscles the incidence of varicosities in the human being is not so great as it might otherwise be. In the pelvis the situation is different. In the presence of chronic pelvic congestion the superimposed physiological hyperæmia of menstruation may cause discomfort commonly described as a dull, steady ache. As a rule this dull ache or bearing down precedes the actual onset of the flow and seldom lasts longer than twelve hours.

This type of discomfort is more often seen in tired mothers and young women with poor tonus. It may occur alone or in combination with uterine cramps. As in all types of dysmenorrhœa, the exact mechanism of pain production has not as yet been clearly and acceptably established. Many theories have been propounded which need not be flourished here. Even though the exact mechanism of pain production be somewhat hazy it appears likely that in chronic pelvic congestion lies another fundamental factor predisposing to dysmenorrhœa.

Endocrine.—A third basic cause for dysmenorrhœa much discussed in the literature today is exaggerated physiological contractility of the uterus. With the introduction of the intrauterine bag method of recording uterine activity a definite time relationship between the menstrual cramp and uterine contraction has been verified. The basis for exaggerated contractibility of the uterus may be disturbed emotions, as has already been pointed out. That it also occurs as a result of endocrine imbalance now appears probable. It has long been known that the mature uterine musculature undergoes regular rhythmical contractions. In recent years the nature of these contractions has been studied and their origin attributed to hormonal stimulation. In 1932 Novak and Reynolds[2] showed that in the rabbit œstrin was a stimulator and progestin an inhibitor of uterine contractions. While there exists a good deal of species difference in the response of uterine muscle to both drugs and hormones it has been reasonably assumed that what was true of the rabbit was also true for the human. Consequently, corpus luteum hormone was quickly looked upon as a panacea for so-called essential, primary or crampy dysmenorrhœa. The problem was not so simple, however, and the therapeutic use of progestin in the treatment of essential dysmenorrhœa was found to be disappointing. To complicate the picture Moir,[3] Wilson and Kurzrock,[4] and Lackner, Krohn and Soskin,[5] by means of intrauterine bags connected to recording instruments, revealed definite rhythmical contractions of small amplitude occurring in the human uterus *in vivo* during the follicular (œstrin) phase of the period and less frequent but considerably amplified contractions during the luteal (progestin) phase. If we unqualifiedly accept these findings it can scarcely be assumed that progestin is an inhibitor of uterine contractions in the human being. The fact that the urine progestin curve shows a drop shortly before the onset of the menstrual period (Fig. 4) does not alter this point of view, since contractions of considerable amplitude were shown to occur during the luteal phase of the period and, further, because a definite delayed response in the myometrium occurs following either withdrawal or injection of hormones. In spite of this contradictory evidence the part played by these hormones in some cases of dysmenorrhœa appears to be very real. The rhythmical contractions occurring in the uterus are the result of hormonal stimulation and, further, the painful cramps of so-called primary or essential dysmenorrhœa are synchronous with these uterine contractions. The fact that primary or essential dysmenorrhœa tends to be self-limited, decreasing or disappearing as the girl matures and bears children, suggests that hypoplasia of the uterus and related organs is not such an obsolete factor in dysmenorrhœa as many observers would have us think. Interestingly enough, dysmenorrhœa is thought not to occur in association with anovulatory bleeding.

The exact mechanism by which pain is produced, and why some women have pain and others with uterine contractions of equal amplitude do not, is still one of the mysteries of the dysmenorrhœa problem. Crampy or spasmodic dysmenorrhœa is most often seen in younger women still in the stage of physical and physiological development, and the fact that it is not supposed to occur with anovulatory bleeding may account for its rather irregular occurrence during the first year or two of menstrual life.

While there are many causes for dysmenorrhœa in most instances the basis will be found in the relationships here discussed. A reasonable understanding of these basic causative factors is desirable and will go a long way toward simplifying management. By learning as much as possible regarding the cause of menstrual discomfort the physician may develop a tempered, rational treatment based on factual evidence, seldom marked by excursions into interesting but spectacular forms of medical and surgical therapy.

TREATMENT

When boiled down to fundamentals the actual management of dysmenorrhœa will be found to be based on, first and foremost; (1) comprehension of the more important underlying causative factors; (2) a thoroughly complete history; (3) a practical classification on the basis of etiology, if known; otherwise on the basis of the type of pain; (4) a complete and careful physical examination; (5) full evaluation of predisposing and contributory causes (disturbed emotions or altered physical health, etc.) in every case; (6) the application of specific remedies.

Where considerable pain is involved treatment must have two objectives: (1) the relief of pain, and (2) the correction of underlying causes. The actual relief of pain may be surprisingly simple or extremely difficult. The peace of mind and reassurance which comes to the patient following a thorough examination by a competent, careful and understanding physician may do much toward paving the way. Indeed, reassurance and removal of predisposing emotional and physical factors is the first step toward productive therapy. Drugs commonly helpful in bringing relief of pain are: (1) atropine—gr. 1/120 every four to six hours for severe cramps; (2) Tr. Belladonnæ—15 drops every 3 to 4 hours for severe cramps; (3) phenacetin, gr. x, caffeine citrate, gr. v, strontium bromide, gr. xx (divide into 5 capsules), one every 2 to 3 hours; (4) aspirin, gr. x. Repeat in two hours.

Since cure is seldom achieved immediately the value of heat, bed rest, premenstrual laxatives, and mild sedation should not be overlooked. The temporary use of the more powerful analgæsic drugs is occasionally necessary. A combination of aspirin, 10 grains, and codeine, 1 grain, in capsule form will usually suffice.

From the physician's point of view remedial measures directed toward permanent cure are more important. These will depend upon the primary and contributory causes. In younger women with so-called primary or essential dysmenorrhœa of a spastic or crampy nature endocrine therapy may prove helpful. The use of œstrin as a means of hastening development and maturity of the uterus appears to have considerable justification. As a rule this agent should be administered during the follicular phase of the cycle and in adequate dosage. Œstrin therapy has been most helpful in young women with hypoplastic genitalia. Where there exists no hypoplasia the use of progestin may be justified on the basis of laboratory experiments already mentioned.

It is important always to remember that these young women seldom go through life with painful periods. With improved physical and mental health, and with sexual maturity, the incapacitating cramps may dwindle into a trivial discomfort. This does not mean that patients with dysmenorrhœa should be neglected or permitted to suffer excessively, but it does imply patience and conservatism. When physical and environmental factors have been minimized the remedial response to any form of therapy is favourably influenced.

For secondary or congestive dysmenorrhœa the use of drugs for the relief of pain is seldom a difficult problem. Since most of these patients show no significant pelvic disease the solution becomes a matter of improving body tonus and reducing pelvic congestion. In the poor-toned person, overwork and fatigue may be quite as conducive to venous stasis as lack of exercise and sedentary habits. On the one hand rest becomes a therapeutic necessity, while on the other a regimen of greater physical activity throughout the menstrual cycle is desirable. Prescribed exercises should be intelligently presented and properly used. Many systems of exercises have been reported and the benefits to be derived from their use have been attested many times in our schools and universities. The value of elevating the feet and lowering the head during rest periods should not be overlooked. As with the primary group, response to remedial therapy though seldom dramatic is nevertheless real, and permanent relief is a common achievement.

For dysmenorrhœa resulting from acquired disease, allergy, infections, tumours, strictures, endometriosis, etc., specific therapy, sometimes surgical, directed toward correction or eradication of the disease is clearly the proper procedure. Here a word of warning may not be out of place. Malpositions of the uterus, fibroids, infections, endometriosis may cause dysmenorrhœa but *more often they do not.* Consequently surgical intervention primarily for the dysmenorrhœa should be thoroughly premeditated. Allergic dysmenorrhœa is still difficult to recognize, but should be suspected in women manifesting other allergic disturbances.

The treatment of neuritic (not neurotic) dysmenorrhœa must remain empirical until such time as its clinical recognition becomes readily possible and specific therapy of proved value is made safe and generally available. Much additional work must be done before its significance as a cause of dysmenorrhœa can be evaluated.

In this discussion surgical procedures have been purposely omitted, not because surgery is valueless or undesirable but rather because it is so seldom necessary. In the past ten years at least seventy-seven papers have appeared on presacral neurectomy for dysmenorrhœa. The operation is a good last resort for the intractable forms. The actual need for it, however, is not great and would be still less were some of the time devoted to acquiring its technique spent in the actual study of dysmenorrhœa.

In summary, then, it may be said that the management of dysmenorrhœa is in large measure dependent upon: (1) willingness to meet the challenge of dysmenorrhœa as a medical problem; (2) a good understanding of the subject; (3) recognition that there may be overlapping of predisposing and causative factors; (4) maintaining a dual objective—(*a*) relief of pain, (*b*) permanence of cure; (5) rational therapy based on a knowledge of fundamental causative factors.

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IN VITRO EXPERIMENTS ON THE EFFECT OF THE ADDITION OF BLOOD SERUM AND BLOOD PLASMA ON THE SEDIMENTATION RATE*

BY R. R. STRUTHERS AND H. L. BACAL

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LABORATORY studies present evidence of active rheumatic fever long after clinical evidence of the disease has subsided. Our own studies,[1] as well as those of other workers, tend to show that the sedimentation rate is probably the most delicate test for the activity of rheumatic fever, in that it is the last abnormality to return to normal after activity.

We have formed the opinion that rheumatic infection could be divided into three group types according to the behaviour of the sedimentation rate, namely:

1. *Acute rheumatic fever* is a manifestation of rheumatic infection in which the sedimentation rate falls rapidly from a high level to a normal, following the subsidence of symptoms.

2. *Chorea* is a manifestation in which the sedimentation rate is constantly normal in the absence of complications.

3. *Rheumatic carditis* is a manifestation in which, with recovery, the sedimentation rate *falls slowly* during a period of months to a normal level. Because of this latter phenomenon these studies of *in vitro* experiments were undertaken, with the hope that on the addition of either well blood serum or well blood plasma to the "active rheumatic sedimentation rate setups", the sedimentation rate would approximate more normal levels. Should such be the case, the giving of transfusions of either well blood serum or well blood plasma to a patient with active rheumatic infection would cause the sedimentation rate to be less rapid and perhaps through some process lessen the activity of the infection.

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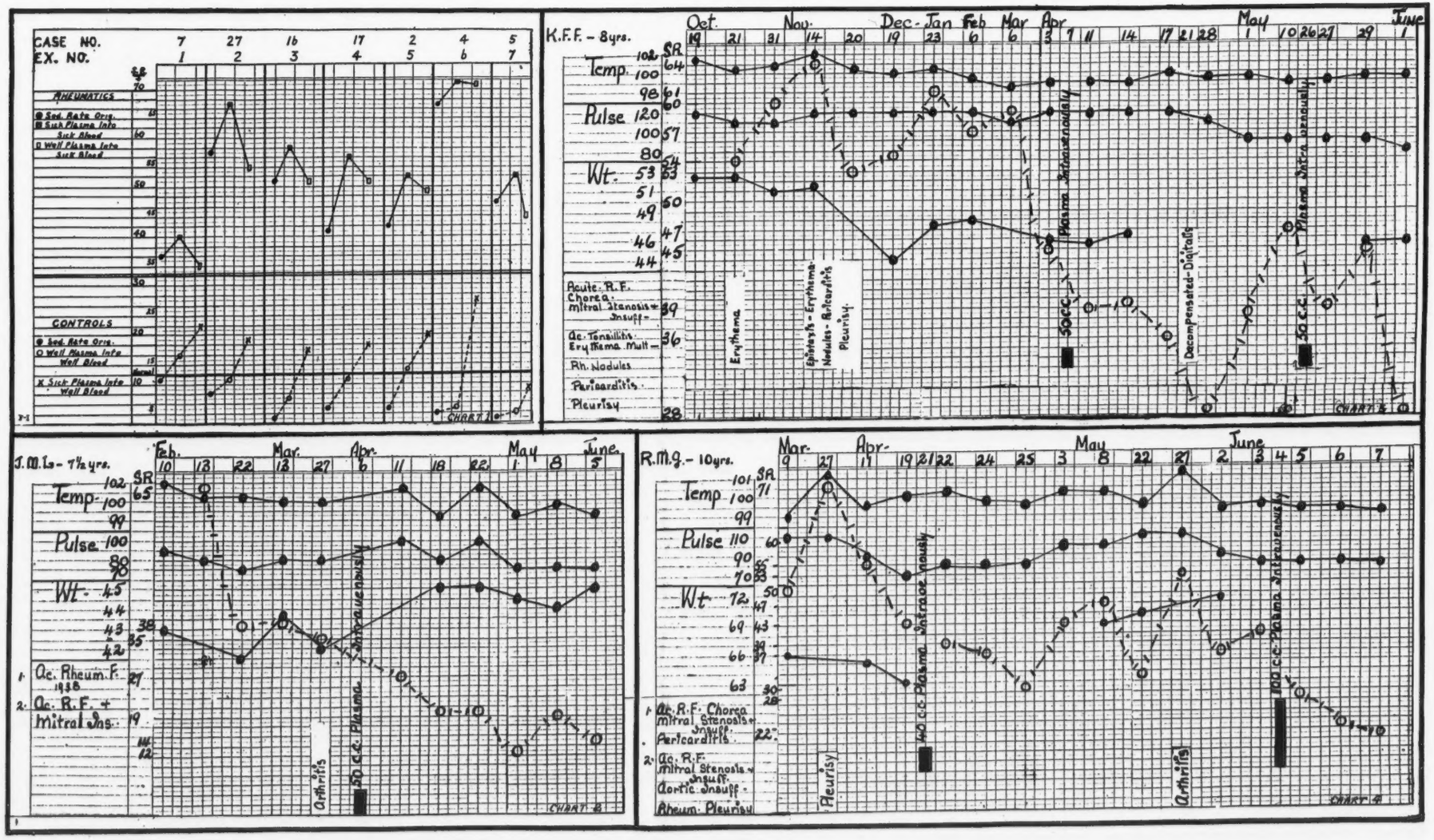
CASE NO.
EX. NO.
RHEUMATICS
CONTROLS
CHART 1
K.F.F. – 8yrs.
Temp.
Pulse
Wt.
Acute R.F. Chorea. mitral Stenosis + Insuff –
Ac. Tonsilitis Erythema. Mult –
Rh. Nodules
Pericarditis
Pleurisy
Erythema
Epistaxis - Erythema - Nodules - Pericarditis
Pleurisy
30 c.c. Plasma Intravenously
Decompensated - Digitalis
50 c.c. Plasma Intravenously
CHART 2
J.M.L. – 7½ yrs.
Temp.
Pulse
Wt.
1. Ac. Rheum. F. 1938
2. Ac. R.F. + Mitral Ins.
Arthritis
50 c.c. Plasma Intravenously
CHART 3
R.M.G. – 10yrs.
Temp.
Pulse
Wt.
1. Ac. R.F. Chorea Mitral Stenosis + Pericarditis
2. Ac. R.F. mitral Stenosis + Insuff. Aortic Insuff. Rheum. Pleurisy
Pleurisy
40 c.c. Plasma Intravenously
Arthritis
100 c.c. Plasma Intravenously
CHART 4

METHOD OF PROCEDURE

In all these *in vitro* experiments the patients were active rheumatic cases with a high sedimentation rate. The controls had a negative history of rheumatism, had a normal sedimentation rate, and were of compatible blood groups with the patients.

The sedimentation rate method used was a modification of that described by Payne[2] in 1932, in which 0.1 c.c. neutral sodium citrate (C.P. 3.8 per cent) was used as an anti-coagulant to every 0.4 c.c. of the patient's blood, thus making a dilution of 1 in 5. Here the sedimentation rate is the height of the clear column of plasma in mm. at the end of one hour. Values of over 12 mm. can be considered abnormal.

In all of these experiments 0.1 c.c. or the equivalent of 20 per cent of blood serum or blood plasma was added to each sedimentation test (0.1 c.c. to 0.5 c.c. of sedimentation rate).

ON THE EFFECT OF BLOOD SERA ON THE SEDIMENTATION RATE

Four patients and 4 controls were used. The sedimentation rate tests were set up in the following order:

CONTROLS

Sedimentation rate (undiluted)—normal
Sedimentation rate and normal serum } Clotted
Sedimentation rate and sick serum }

RHEUMATICS

Sedimentation rate (undiluted)—high
Sedimentation rate and sick serum } Clotted
Sedimentation rate and normal serum }

Since the addition of 0.1 c.c. of blood serum to each sedimentation rate set-ups caused them to clot, this method of experimentation had to be stopped.

ON THE EFFECT OF BLOOD PLASMA ON THE SEDIMENTATION RATE

Twenty-seven patients and 27 controls were used. The sedimentation rate tests were set up in the following order:

CONTROLS

Sedimentation rate (undiluted)—normal ●
Sedimentation rate and normal plasma O
Sedimentation rate and sick plasma ×

RHEUMATICS

Sedimentation rate (undiluted)—high ●
Sedimentation rate and sick plasma ■
Sedimentation rate and normal plasma □

Controls.—The addition of 0.1 c.c. of normal blood plasma to each of the control sedimentation rate set-ups caused all the sedimentation rates to be higher, by a process of dilution of the red blood cells, etc. (O). The addition of 0.1 c.c. of sick blood plasma to each of the control sedimentation rate set-ups resulted in even higher sedimentation rates than the above, apparently due to something being present in the sick plasma, etc., besides dilution (×). The addition of 0.1 c.c. of sick blood plasma to each of the rheumatic sedimentation rate set-ups caused them all to have a higher sedimentation rate than the original (■).

Rheumatics.—In 17 experiments out of the 27 the addition of normal plasma to the sick sedimentation rate set-ups resulted in a decrease of the sedimentation rate (□). In 4 cases the decrease was below the original sedimentation rate level. This, of course, led us to believe that the administration of normal blood plasma, intravenously, to active rheumatic fever patients, would probably lower the sedimentation rate in some and might be beneficial clinically in hastening a cure.

Three patients with severe rheumatic fever complicated by carditis and other rheumatic manifestations were given blood plasma intravenously. These particular cases were selected because of their severity, frequent complications, and a failure of the sedimentation rate to return to normal within a reasonable and average time.

In all these charts the top solid line represents the rectal temperature; the second, the sleeping pulse rate; the third, the body weight; the broken line, the sedimentation rate at the end of one hour.

It is our clinical impression that these patients were benefited somewhat by blood plasma transfusions.

Although we cannot draw any definite conclusions as to the value of blood plasma transfusions in active rheumatic carditis, it is felt that in certain selected cases the clinical course and the activity of the infection might be shortened. Further experimentation is recommended.

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THE RADIOLOGIST AS A CONSULTANT*

BY W. M. GILMORE

Stratford, Ont.

THE growth of radiology since its inception some forty years ago has been marked by many disappointments as well as encouraging findings, unsatisfactory as well as satisfactory accomplishments. We have seen certain things become standard practice and developed to a high degree of efficiency. Others have proved inadequate or of no avail, and have fallen by the wayside. Out of the cauldron have come to us the various instruments, procedures, and facts which we correlate and name "radiology". Radiology basically is a science combining the utmost in achievement in physics, chemistry, biology and mathematics. As a branch of the art of medicine therefore it primarily requires that its profession shall be equipped to deliberate with the other branches of medicine in the practice of this art. We must not forget we are, first, physicians, secondly, radiologists.

In the period following the discovery of the roentgen-ray the profession consisted of physicians, photographers and men of other sciences. They showed a keen desire to delve into the mysteries of the new field and unfold its possibilities. These men were self-trained by observation, convention with their fellows, and reading of the literature. Although this involved a meagre beginning no other course was possible, nor is any other course possible today to the men of this group who are now living. They are the pioneers of radiology and form the trunk or main stem of our unit. With the rapid growth of radiology branches appeared, these being the men deriving their knowledge from the pioneers, at first by the short course, now by a three-year apprenticeship or internship. Already these branches are bearing other branches and showing healthy growth. However, unhealthy signs are in evidence, indicating the necessity for some judicious pruning. Certain men have undertaken radiology without attaching themselves to the trunk or a strong branch by a suitable apprenticeship. The short course is still present, and while it bears much fruit the branch is weak and often is bent badly in the direction the wind is blowing. The tree has also suffered due to our unwillingness to shake off outworn habits. Outsiders have invaded some of our more fruitful branches, to supplement their own field. We have seen the surgeon and gynæcologist acquire radium, the internist x-ray diagnosis, and the dermatologist x-ray therapy. If radiology is, as we contend, a clinical specialty demanding medical training instead of a technical laboratory procedure to be performed by laymen, then radiologists must demonstrate to their medical colleagues that such is the case. The question now is, "What are we going to do about it"?

I say the answer is to make the radiologist more and more a consultant. You ask if the radiologist is not consulted now in the reading of films? Yes, but this is woefully inadequate as a proper consultation. The films taken may bear no relation to the patient's requirements, or they may contain only part of the available story. Hence it is necessary that the radiologist see the patient or have the case reviewed for him by the attending physician. During the course of the examination it is often necessary that the radiologist make observations on the wet films in order to direct the taking of others. Finally, the radiologist should be prepared to discuss the case with the attending physician. If further information is still necessary to make a proper diagnosis he should be in a position to state what diagnostic procedures are indicated. You can readily see how much lower a standard we are satisfied with when we permit:

1. A blindly followed routine technical procedure.
2. Reading of films by mail.
3. Written reports which contain so much technical detail and irrelevant matter that they require an interpreter.

Such a standard tends towards:

1. Unnecessary filming of the patient, often requiring his return for repeating the examination.
2. Possibility of error.
3. Discrediting radiology as a clinical aid.

* Read at the Fifty-ninth Annual Meeting of the Ontario Medical Association, Section of Radiology, Hamilton, June 1, 1939.

The country contains many medical men who were at one time or are now mildly interested in x-ray work. Their interest is due to either lack of adequate local service or as a supplement to their practice. Lack of adequate local service may be quite real, as in small isolated communities, or conditional, as in the larger community, where up to a dozen antiquated x-ray outfits may be operating, and none of them rendering adequate service. In a recent address on the cost of medical care Dr. Hugh Cabot called attention to the unnecessary amount of diagnostic equipment in the average community, especially x-ray machines, which tend to increase the overhead cost. I doubt if any of you will disagree with his opinion. At the same time the multiplicity does not only not serve the community as well but prevents the consummation of the x-ray work into one well-equipped and properly staffed unit. Some time ago I received a letter from a schoolmate saying that he had the opportunity of buying a secondhand x-ray outfit, and would I advise him accordingly. He also asked where he could spend a couple of weeks in learning x-ray, not that he wanted to be a specialist but he would like to master it well. Such conceptions of radiology must be corrected.

Not long ago I examined a tourist accident case from another city, and during the examination the nurse was asked by the patient if I were a real doctor or just the x-ray man. Needless to say she lived in a community served by about nine small x-ray units and no radiologist, and her opinion of radiology represented the common views of that city. Nor is this opinion confined to the smaller city. I had the opportunity this spring of reviewing a set of films made by a non-medical man who calls himself an expert. Perhaps he is, but I had no way of knowing that the proper part of the body had been examined, or that they bore any real relation to the patient's requirements. The only opinion I could give was that the films submitted indicated no disease. The radiologist has transferred so much of the routine x-ray work to the care of the technician that the public has been led to believe the radiologist to be unnecessary for the commoner uses of x-ray, thereby enabling the lay laboratories to operate without his services. Some of our hospitals have taken the same attitude, and so long as they have a good technician the reports can be signed by one of the staff doctors. Why should they engage a radiologist to be a satellite of the surgeon and read the occasional difficult x-ray film? I once visited the radiological department of a well known tuberculosis institution in the eastern United States and while there observed the five hour fluoroscopy of their gastric patients. In answer to my questions the man operating the fluoroscope informed me that he could detect even one tuberculous ulcer in the cæcum. On further questioning he stated he was the technician with no general medical training. Since that day I have had reason to discount any literature or statistics published from that laboratory.

With a consultant radiologist in charge of an x-ray department we can expect:

1. Better quality of films.
2. Faster service to the patient and doctor.
3. Introduction of new procedures and equipment.
4. Discarding of outworn apparatus.
5. Lowered costs, by increased efficiency.
6. A better understanding of the value of radiology by the laity.
7. Improved relations with the rest of the profession.

The planning of a radiological department can make or mar the service at the outset, and the consultant radiologist should know how to lay out his work. We have all seen radiological departments laid out in such a way that efficiency of operation was hardly possible. Privacy of the patient was non-existent during examination, and surgical procedures on the x-ray table were impossible because of inability to keep the operative field clean; this in addition to poorly arranged electrical equipment, inadequate protection from radiation and electric shock, and long distances between the most used points. There are many minute details which, when utilized, can make an x-ray outfit the acme of efficiency and economy.

The rigid following of a routine technique may be quite right from the technician's point of view. However, the radiologist is expected to do more than this, by exercising his judgment as to the requirements of the case. Quite obviously a patient could go to a laboratory, have all the tests possible performed, and when the positive findings are known receive symptomatic treatment from the corner drug store. The consultant is expected to save the patient this loss

of time and money by giving him the shortest route back to health. Unless the consultant does this, in the majority of his examinations his existence in that capacity is not justified. His task begins with the determining of the work to be done, either by a word with the attending physician, clinical inspection of the patient, or both. For example, every fracture case does not require initial films, because the surgeon has already made the diagnosis. Setting under the fluoroscope and films in two positions through the plaster cast are sufficient in many cases. In automobile accident cases I find that a general fluoroscopic examination of the body will reveal unsuspected fractures, fluid in the chest, or gas in the abdomen more quickly and without the shock incurred in a thorough physical examination.

Following the diagnosis the information obtained must be imparted to the clinician in such a way that he can put it to practical use. First and foremost, we must speak to him in his own language. I think there is nothing more ridiculous to the clinician than to be given a report which contains many references to the pieces of x-ray equipment, the processes used or the technical details. It is of no value to him whether the film was made using the Bucky or the compression cone, whether the cephalo-caudad angulation or any other improvising was used. He is after reliable information and loathes to have to ferret out for himself the material of value in a report. He is not concerned in having the stomach examination repeated because of pyloro-spasm evident on the films. It is the cause of the pyloro-spasm he is interested in and which he wishes to treat. If the x-ray examination does not give information which explains the patient's condition the radiologist should make a frank statement to the clinician. If the latter receives no help he is not misguided. When I heard a radiologist referred to recently as "Old Hawk Eye", in spite of the crude manner of speaking I was impressed with the genuine sincerity of the compliment.

On several occasions I have encountered lack of fidelity of the clinician concerning co-operation. Once, after x-ray examination of the stomach only, I reported no evidence of malignancy. Operation revealed cancer of the gall bladder, and the patient was informed that the x-ray did not show it, regardless of the fact that the gall bladder was not included in the examination. Another disparity was drawn to my attention when a clinician enquired regarding the x-ray of a patient formerly with a brother practitioner. Physician No. 2 made a definite clinical diagnosis which proved in exact agreement with the x-ray report submitted to physician No. 1. However physician No. 1 had told the patient that x-ray revealed nothing pathological. In evaluating the proper course to take I try to consider the matter in terms of value to the patient. Films and reports on a patient are for his benefit, and should he change his physician or consult in another centre the x-ray information is placed at his disposal, unless circumstances indicate otherwise.

Regarding the explanation of films to the patient I find that the specialist prefers to do this for himself, while the general practitioner encourages an explanation by the radiologist in his presence. This latter attitude makes the radiologist more and more a consultant in the eyes of both patient and physician.

As a medical expert witness the radiologist is again a consultant. At this time, however, the patient's interests are not physical but financial. In most cases he is seeking compensation for injury, and the radiologist may be either supporting his claims or attempting to evaluate exaggerated injuries. The radiologist should remain as impartial as possible. The language used in testimony should be easily understood by the members of the court. I have found that it is good practice to begin testimony by pointing out the various features which the films show, and to follow this immediately by interpretation. The jury will see the film features as pointed out. The interpretation is accepted by them as expert evidence, particularly if careful explanations are given. However, it is often possible by a friendly consultation with the expert witness of the opponent and the attorneys to effect a settlement out of court. This is much preferrable and more likely to result in an equitable settlement. After all are not medical witnesses more proficient in judging a man's disability and just compensation than a group of jurists?

There are several situations of recent origin which we must consider in so far as they influence radiology: (1) the increased amount of relief medicine; (2) the increased demands for state medicine; (3) the establishing of government services. It is so evident that state medi-

cine in some form will be upon us within the next decade that we should put our profession in order, so that we may control and direct the transition as well as the ultimate course. There is an old feeling still ingrained in the make-up of a physician that he should devote his thoughts to the scientific phases of his work and let the economic phases take care of themselves. Perhaps this is the reason physicians are reputedly poor business men. But now the economic phases have thrust themselves on us and we have to talk about them, however distasteful it may be. Therefore we are all interested in what we call "socialized medicine", which, for our purposes, we will define as any system whereby either the professional or economic aspects of practice are controlled by laymen. The two of them go hand in hand, for economic control will lead to control of the profession. It is axiomatic that the man who pays the fiddler eventually will call the tune. For most physicians socialized medicine is something to talk about at medical meetings. For us in radiology it has arrived in one form or another. This need was called to my attention very noticeably a few days ago when I heard of a local man who sought treatment at a nearby clinic for a small malignant growth in the mouth. The patient's story, after visiting the clinic, was that he would have to spend the price of his farm to have it treated, and rather than do that he would do without treatment. No one saw fit to inform him about any of the cancer clinics provided by the government. Realizing the dangers surrounding radiology from an economic standpoint, the four national societies have organized the Inter-Society Committee for Radiology, whose sole purpose is to deal with matters affecting the economics of radiological practice.

The attempt on the part of hospitals to combine the work of the radiologist with the pathologist, superintendent, or handy man, shows how inadequately he has established himself as an entity in the hospital or as a consultant with his confrères. The Inter-Society Committee for Radiology has been publishing interesting reports on such matters for several months. One of these reports (*Radiology*, December, 1938, p. 737), shows how in England provision is made for the remuneration of the radiologist for indigent work. The radiologist is also protected by adequate regulations for pay hospital work and private consultations. Another report (*Radiology*, March, 1939, p. 351), states rather fully the situation in Germany regarding radiology, and how it fits the general scheme of state medicine. Since Germany is the birthplace of radiology, since she also has been a pioneer in state medicine, and also because of her necessity for strict economy, one can look at this report with interest, and note the following.

1. All radiological work is paid for.
2. Fees and procedures are standard, being controlled by the German Roentgen Society.
3. Two classes of work are recognized at two different rates, namely, the Preugo and Adgo. The Preugo is based on minimum requirements, and the fees are pro rata per film size, plus a fee for consultation. The Adgo is a de luxe examination and proportionally more expensive. All health insurance radiological work follows one or other of these two systems.
4. The German Roentgen Society controls the instruction, examination, licensing and discipline of all radiologists, and also those doing part-time radiology.

There is a movement on foot at present to have all physicians present themselves for re-examination every five years, and for specialists to be licensed by specialty boards. This movement is promoted by medical men, and is certainly in the best interests of the profession. It is not enough to have an organization where we meet once a year to renew acquaintances. The profession must go farther than this. We should provide such a standard of work that all ideas of mediocrity concerning radiology would cease to exist. We must also provide a supply of trained radiologists to be available to fill all vacancies. We must keep closer to professional ethics than to business principles, but maintain enough of the latter to support the profession so that government subsidy is not required, thereby avoiding the evils of patronage and lay control.

SOME CLINICAL LESIONS OF THE VULVA*

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TRUE *hermaphroditismus*, a double pair of sex glands, both ovary and testes, with a well developed and functioning Wolffian and Müllerian systems is rarely if ever seen. The closest resemblance to this was a case reported by the Moulage Klinik, where a well formed penis and vagina with a cervix and uterus was found and an autogenous fertilization and one abortion resulted. More often we see pseudo-hermaphroditism where one pair of sex glands is found but having the parenchyma both of ovary and testes. According to the hormonic secretion various grades in development of the Wolffian or Müllerian systems are seen.

The case presented is that of a girl of 13 years of age who at the age of three had a relatively large clitoris. She selected girlhood habits, but at the age of puberty she was examined gynæcologically and a blind vagina with palpable utero-sacral ligaments but no uterine fundus was found. The clitoris was about one inch long. A diagnosis of pseudo-hermaphroditism was made.

During the life history of such individuals the functional, as well as the anatomical, system may change. There was the famous case, Carl Lohmann, a masculine pseudo-hermaphrodite, who lived for forty-six years as a female. He then assumed male attire and married as a man.

Normally the mesoderm does not grow between the ectoderm and the entoderm of the cloacal membrane. Should the mesoderm grow between these layers at this anatomical point then all degrees of resistant and imperforate hymen and closed proctodæums develop. Occasionally later in adolescence excessive mesodermic tissues develop in the hymenal edges or in the labia minora, giving rise to Hottentot-like folds, or even papillary growths. Rarer is overgrowth of mesodermic vascular tissue, as hæmangioma of the vulva. Of rare occurrence is cystic inclusion from the Wolffian system between the hymen and the clitoris.

Embryological herniation through potential hiatuses of the vulva occur.

Case 12809, a full term female baby, born of a parous mother, spontaneously, showed a marked alimentary herniation into the left labium. On the sixth day a loop of intestine was resected from the vulva. The peritoneum was closed and the baby recovered. Histological section showed normal bowel.

The reason is not embryologically explained why, where the gubernaculum of the sex gland crosses the Müllerian ducts, a fixation takes place and the canal of Nuck is permanently closed. If the descent of the ovary is abnormally low a failure in fixation in the canal of Nuck at this point follows and herniation results. The anatomical contour of the vulva may be altered because of mechanical distension in the canal of Nuck.

Varicosities about the vulva usually find their origin in pregnancy. Heart lesions and kidney lesions also predispose to it. Occasionally surgical removal of large varicosities is necessary. Hæmorrhagic extravasation into the vulva may follow trauma of child-birth, operation or direct injury.

One case showed an extensively hæmorrhagic extravasation into the vulva following removal of a metastatic cancerous nodule.

We have found that early incision and removal of blood clot gives the best results, because necrosis and infection is likely to follow upon delayed surgical treatment.

Acute vulvo-vaginitis is characterized by swelling, œdema, reddish and purulent discharge. It arises primarily from masturbation, mechanical irritation, and gonorrhœal discharge. This acute inflammation may spread to the urethra, rectum, and occasionally to the bladder. Acute vulvo-vaginitis in children is usually of gonorrhœal origin, yet severe inflammations of the vulva may follow upon contamination in scarlet fever, diphtheria, and septic throats. Chronic vulvitis may follow upon uterine septic discharges in cases of septic endometritis and in discharges from infected degenerating uterine and cervical tumours. We have had two severe cases of erysipelas of the vulva following child-birth, one of which died of septicæmia.

Dermatitis of the vulva.—Acute and chronic dermatitis of the vulva frequently follows upon

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chronic vaginitis and endocervicitis where a constant leucorrhœal discharge is present. The pruritus accompanying it causes scratching and a true dermatitis follows. One must always consider diabetes and constitutional disorders when looking for the origin.

Acute ulcerations of the vulva (ethiome).—This condition, better known clinically as "rodent ulceration", is mostly seen in negresses and those women who have had syphilis. Numerous devastating fistulous ulcers form in the labia majora. They are not affected by anti-syphilitic medication and heal very slowly under careful hygienic measures.

Avitaminosis. — Ulceration of the vulva has been proved to be due in a few cases to lack of proper vitamins in the food.

The following case was a woman of 28 years, para-2, who in her 35th week of pregnancy developed ulcers of the vulva. The Wassermann test was negative. The ulcer had a dirty grey, anæmic sloughing base, and spread rapidly. Hot fomentations to the vulva did not help. Severe pain was present. Anti-diphtheritis serum (20,000 units) did not alter its course. Gas serum (20,000 units) was given without result. A microscopic section from the ulceration showed a necrotic inflammatory granulation tissue rich in leucocytes. By chance a tentative diagnosis of avitaminosis was made because a study of her domestic life showed that she could not afford proper foods. Large doses of vitamins A and B were given and almost immediately the ulcers began to heal and remained healed until after the delivery of her baby, when she was discharged.

Ducrey's chancroid lesions of the vulva are not frequently seen in our clinic.

The case presented represents an acute painful ulceration of the vulva occurring at 6th month in a parous woman, preg. vii. Reddish pinpoint ulcerations began on the labia minora over the hymen and up over the clitoris region. Hot lead and opium fomentations caused more pain and swelling. Numerous soft ulcers with thick rims and moth-eaten floors covered with a yellowish exudate appeared. The patient came to hospital by ambulance. Culture was sent to our bacteriological department and a diagnosis of Ducrey's chancroid was made. Mercurial (2 per cent) cones were laid in the vagina and between the labia. In 48 hours a definite improvement was noticed. The patient was discharged in one week cured. She returned three months later and delivered her baby without any recurrence of this condition.

Tuberculous lesions of the vulva are uncommon in our clinic. There are two types, (1) ulcerative forms which destroy considerable tissue, and (2) hypertrophic forms which produce large polypoid growth, often as large as a pigeon's egg. The lesion may be confused with a luetic process or with the beginning of carcinoma. It may be followed by elephantiasis of the vulva. Tuberculosis of the vulva is possibly always secondary, yet I think a primary case occurred in our clinic.

The patient was a woman of very careless hygienic habits who developed numerous fistulous tracts and excavating ulcers on both labia majora. She was admitted to the ward and a microscopic section showed a poorly nourished collagenous connective tissue suggestive of tuberculosis yet no giant cells were found. Surgical incision, insulin treatments, quartz lamp, hot fomentations, all failed to cure the condition completely. She was treated through the gynæcological out-door for one year, painting the surface twice weekly with mercurochrome. She finally developed a fistula over the coccyx, and we sent her to the surgical out-door clinic where they found tubercle bacilli in the coccygeal fistulous discharge. The diagnosis was therefore finally made of tuberculosis of the vulva.

Syphilis of the vulva.—This may occur as an initial sclerosis, or hard chancres, or as primary or secondary papules. The lesion prefers the vestibule, nymphæ and commissures.

The example given is of a patient aged 52, para-5, with a strong familial history of lues; 13 brothers and sisters died of unknown causes. Six weeks before admission to hospital a small burning, itching ulcer was noticed on the vulva, and three weeks later the inguinal glands became hard and painful. On admission the vulva had a yellowish-pink mottled eruption lying between the labia majora and minora, and across the posterior fourchette. A microscopic section was taken and showed a thick collagenous connective tissue, poor in nuclei, a granulomatous growth. The Wassermann test now, after 11 months of continuous anti-luetic treatment, was negative. Bichloride dressings were applied locally. Salvarsan treatment was re-established, and soon the lesion disappeared. The diagnosis was tertiary lues of the vulva.

Diabetic granulomatous ulceration of the vulva is only a local manifestation of the general debilitating circulatory disturbance. Why the vulva should be so graphically selected for a local lesion is not explained. The ulcer is produced by a pruritus, and scratching creates an infective dermatitis with ulceration and necrosis. Gangrene-like edges develop on the edges of the ulcer.

The case illustrated was from a female aged 30 years, who complained of an ulcer on the vulva for 2 months. This ulcer was itchy and red after scratching. Soon the whole left labia, majus and minus, were involved in massive gangrenous ulceration. Microscopic examination showed a granulomatous inflammatory tissue. Cauterization of the ulcer did not help. Infra-red lamp to the vulva also failed. Local application of insulin on dressings with strict control of her diabetic metabolism allowed the ulcer to heal.

Benign tumours of the vulva. — Ordinary warts or squamous papillomata occur frequently on the vulva. Contrary to medical literature, we have found that carcinoma rarely or never arises in such growth. Fibromyomas of the vulva usually can be traced to round-ligament growths or from the clitoris. Lipomas may superficially resemble fibromas. Such circumscribed growths may become hard, nodular, polypoid and later pedunculated. They may grow

to the size of a child's head. *Angiomas, chondromas* and *neuromas* are very rarely seen in the vulva. Multiple coral-like papillary growths or pointed condylomata are frequently seen in women who have borne children, but mostly in those that have had gonorrhœa. Acutely inflamed papillomas with richly vascular papillæ covered by a cornified layer of epithelial cells give the surface an elevated coral-like appearance. We have successfully treated such lesions by repeated applications of the cautery and by careful local hygienic measures.

Cystic tumours of the vulva are frequently seen in the region of the Bartholinian gland—bartholinitis. With cystic dilatation in the duct operation is best done in the subacute cystic stage, making a longitudinal incision external and parallel to the labia minora.

Endometriomas of the vulva, formerly called sarcomas, appear as hard raised bluish areas on the vulva and vagina. The growth is slow; recurrence is tardy as compared with sarcomas. One of our patients had a growth on the left vaginal wall in 1935, diagnosed as sarcoma. Four years later she returned with another similar nodule in parallel line with the first. The tissue was examined and compared with the first, and a corrected diagnosis of endometrioma was made. Endometriomas differ from endometriosis in that the histological picture shows a cellular unorganized stroma devoid of glands, and not showing necrosis and digestion of tissue. The growth tends to creep along blood vessels and lymphatics in parallel extensions. Treatment by x-ray seems to be as effective as in endometriosis.

Degenerative diseases of the vulva. — Senile changes and atrophy are frequently seen at the approach of the menopause and in later years of life. The labia majora and minora become flattened and board-like because the subcutaneous fat disappears. The surface skin becomes dry and cracked. The introitus gapes. Skin organisms enter the vagina and senile vaginitis results. Lactic acid douches and œstrogenic medication relieve the distress.

Kraurosis vulvæ is an expression of senile change in which the skin becomes leathery, dry, glistening, epidermal hyperplasia. Occasionally one sees a diffuse hypertrophy or overgrowth of the papillary bodies of the corium, leukoplakia. Leukoplakia prefers the labia majora, and often spreads to involve the skin of the perineum. Histologically there is a diffuse thickening of the epithelial layers with downgrowths from the papillary bodies. A cellular reaction of lymphocytes and young connective tissue is seen at the point of invasion.

If leukoplakia and kraurosis vulvæ are not immediately improved by high vitamin and œstrogenic medication excision of the vulva is the proper surgical procedure, making sure that all parts of the pudendum muliebre are removed, otherwise the condition will recur at the line of excision.

Malignant growths of the vulva.—Since we have changed our opinion regarding melanotic sarcoma and now call it melanotic carcinoma, pigmented skin cancers, and also since we have acquainted ourselves with the diagnosis of endometrioma, sarcoma of the vulva has become extremely rare. We have had only two cases of vulva sarcoma.

One case showed a hard nodular growth in the region of the Bartholinian gland, and proved upon microscopic section to be a typical sarcoma. A laparotomy was done because there was a pelvic tumour, and an inoperable sarcoma of the uterus was found. The vulvar lesion was classified metastatic.

Excluding the deep seated adenocarcinomas of the Bartholinian regions, which grow into, not in or on, the vulva, we have two types of autonomous epithelial growths: (1) primary carcinoma growing diffusely from the basal cell layer without much early surface pathological change; (2) carcinoma following upon leukoplakia of the vulva. About 25 per cent of our vulvar cancers began in such a lesion.

The following table shows our results of carcinoma of the vulva over a definite period of time.

CARCINOMA OF VULVA, 1930 TO 1938

Total number of cases treated	27	
" " " primary cases	21	77.7 per cent
" " " leukoplakia	6	22.2 " "
Treated by		
Radium and electro-cautery	5	
Radium and surgery	2	
Radium, surgery and electro-cautery	1	
Radium, electro-cautery and x-ray	1	
Electro-cautery	9	
Electro-cautery and x-ray	2	
Surgery	2	
Surgery and x-ray	3	
Untreated	2	
	27	
Number of cases		
Treated 1930 to 1933	13	
Living 5 years or more	4	30.7 per cent

THE COSMETIC EYE—A PERIOCULAR DERMATITIS*

BY L. P. EREAUX

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PRODUCTS of the animal, vegetable and mineral kingdoms have been employed in the making of cosmetics since the beginning of time. Extracts of seeds, plants, herbs and berries, crushed insects, and even the blood of animals and shell fish have all contributed to man's adornment. Today milady employs cosmetics as a psychological tonic, and gets dividends of self-assurance from her investment. Occasionally, however, when profits become losses, she must engage a dermatologist for, as Solomon said, "Give place to the physician, let him not go from thee, for thou hast need of him". With this tendency to reversion to the savage type, more and more cases of allergy to cosmetics are reported. There is no dermatological condition so terrifying to the laity as the acutely swollen face and eyes.

The "cosmetic eye", a disfiguring dermatitis involving the eyelids, is not a new dermatological entity. It may arise from contact and toxic irritants from many sources. We observe, first, acute inflammatory reaction to the irritant and, later, the eyelids take on a senile look; then the skin becomes scaly, thickened and pigmented. In facial dermatosis the eyelids become involved early and are proverbially the last to heal.

Two types of dermatitis are encountered. The first, where the ocular tissues are involved as a part of a widespread facial dermatitis; the second, where the eyelids alone are affected.

The eye enjoys extreme mobility due to the delicacy and laxness of the subcutaneous tissue and of the surrounding skin. The eyelids have a plentiful vascular supply, but little fat and an abundance of elastic tissue. The concertina-like folds allow of great swelling. The skin of the eye is subject to incessant movement due to winking and change of position. It comes in for more than its share of trauma, indeed more than a rub to the sleepy eye in the morning and to the tired eye at night. This trauma is important in considering the spread of cosmetic irritations, for continued rubbing soon provokes a neurodermatitis on the lids which is slow to heal.

Constitutional background.—Seborrhœa is encountered in a large percentage of patients with this condition, for the greasy or scaly seborrhœic skin retains cosmetics and allows of their penetration. On such a damaged basis, hypersensitivity is prone to occur according to Wise and Sulzberger. Factors of fatigue, mental stress and strain invariably precipitate attacks of seborrhœa. Ill health sets the stage for allergy and aids reactions.

Types.—Practically all of the group treated were women, many of them neurotic and of the emotionally unstable type. Nervousness was complained of in most cases, prior to the attack of dermatitis; possibly predisposing to it. Certainly nervous tension was greatly increased during the time of the eruption. Blondes outnumbered brunettes as reactors to cosmetics.

PREPARATIONS

It is not within the scope of this paper to analyze the highly complicated ingredients of cosmetics. One would wish for the patience and scientific acumen of a Sulzberger who analyzed a sample of lipstick into its fifty-one component parts, to uncover the irritant. A Fifth Avenue address on the label, with a correspondingly high cost, is no guarantee of security. The products of one such establishment must have been tried out on whale skin, for the human integument was consistently intolerant to the preparations.

Powders.—In modern powders the employment of orris root, rice powder and starch has been practically abandoned in manufacture. No lead has been used for many years. Newer preparations are fine spun, free from grit, and contain talcum, kaolin, magnesium carbonate, zinc stearate, zinc oxide, and boric acid. Reaction from the latter two ingredients has been encountered. To satisfy the demands for shades, aniline dyes have been added to powder, which, with the ever-present perfume hazard, irritate the sensitive skin. Powder reactors were not found to be common in our series.

* Read at the Seventieth Annual Meeting of the Canadian Medical Association, Section of Dermatology, Montreal, June 21, 1939.

Rouge burns were encountered in several cases. Irritation was noted over the site of application with subsequent extension to the lower lids. A young matron suffering from a periocular dermatitis, baffled one of my Toronto colleagues and myself. Thorough investigation by us both failed to discover the irritating rouge, used only on special occasions when she matched her cheeks with her party frock. She became the successful sleuth in her own case and the condition completely cleared when the offending rouge was discarded for another make.

Lipsticks are waxy pomades carrying aniline dyes plus flavour, with added bromo-acid for its indelible action. This latter, if of too high concentration, is injurious to health. A recent shipment of lipstick from France to the United States was confiscated because of a toxic content of cadmium and selenium.

Creams.—Cold creams are made of animal, vegetable and mineral products. Water gums, tragacanth, acacia, spermaceti and sodium and potassium hydroxide are used in their manufacture. The added essential oils are potential irritants.

Vanishing creams, made by a combination of soap, glycerine, boric acid, zinc oxide, sterol, cocoa butter and potassium carbonate cause irritation because of their glycerine content or soap compositions.

Night creams and nourishing creams are made up with beeswax and lanolin, and are advertised as vehicles to carry hormones or vitamins deep into the skin. But skin cannot be nourished by cutaneous application. The turtle oil in a popular brand snapped at one lady's skin, with a resulting dermatitis.

Cleansing creams of beeswax, lanolin, and mineral oil are used as substitutes for soap to soften and remove dirt.

Astringent creams generally are built on a basis of lanolin and oxychlosterin base with lecithin added.

A popular *sunburn cream,* made up with a goose-grease base, widely recommended as a skin sedative, contains carbolic acid in its combination. It persistently provokes dermatitis, and has added many cases to our periocular series.

Soaps.—Skin irritations from the use of soap may arise from free alkaline, unsuitable rancid fat, free fatty acids, perfumes, colouring matter, or added medications. Of all the oils that of cocoanut is the most irritating of the saponifiable fats, while olive oil is rated the blandest. It has not always been found harmless in our experience. There is no soap which is suitable for all skins. One cannot single out a specific soap and brand it as a producer of dermatitis. Sir Norman Walker summed up the problem by stating that to some skins any given soap may be a poison. The fault really lies in the idiosyncrasy of the skin of the individual.

Two examples might illustrate this sensitivity. A seborrhœic patient of Dr. Philip Burnett, while using a red carbolated soap, developed a periocular dermatitis within three days of its contact with the skin. Strangely, the tougher skin of the face reacted hardly at all, but the eyes were completely closed. He had previously tolerated other soaps quite well. A college girl, helping to support a radio theatre by her purchases, reacted in the same manner to the dust from soap flakes. Of interest, it may be noted there was freedom from vasomotor symptoms or of irritation of the hands.

Shampoos.—Soap bark is employed for lathering properties, while borax and tar are usual added constituents. A popular radio-advertised product, containing, among other things, arsenious acid, acetone and other harsh ingredients, enjoyed great sales as a result of a jingle contest. But in addition to prizes awarded, several unfortunates received burnt scalps and closed eyes in their zealous attempts to abolish dandruff.

After-shaving lotions have, as a vehicle, alcohol, bay rum or witch hazel, are activated with astringents, and are perfumed. The studies of Burgess and Usher with relationship to the irritating quinine content of one of these products are interesting and instructive.

Cleansing lotions carry witch hazel, borax, formaldehyde, acetic acid and ammonia in their make-up, while bleaches with citric acid, tartaric acid, sodium perborate, and peroxide of hydrogen are irritating from their very composition.

Freckle removers are exfoliating agents. When one considers that mercury, bismuth, formaldehyde, salicylic acid, zinc sulphocarbolate, and resorcin are the active ingredients it is not difficult to understand that dermatitis is a frequent result of their employment.

Perfumes.—Modern perfumes are synthetic products—the complicated blends and mixtures of essential oils. For example, Goodman cites that more than 27 ingredients enter into production of attar of rose. The better cosmetic

concerns are now avoiding the use of oil of bergamot and heliotrope in their preparations.

Hair dyes—hair restorers.—These will be considered as cosmetic agents. For those who dare to dye trouble may be lurking around the corner. The older types of metallic dyes which coated the surface of the hair are now rarely employed. Too many poisonous reactions resulted from the employment of bismuth, mercury, lead, copper and iron salts, as well as those from pyrogallic acid. New aniline dyes which penetrate into the hair shaft itself are now universally employed. Paraphenylenediamine has given place to the newer, less toxic product—paratoluylenediamine. It is wise to advise the patient who is in the habit of having hair dyed, to patch-test on the postauricular skin or at the hair margin before each new application. It is well known that resistance varies and that the concentration and composition of the dye itself fluctuate.

For the relief of the dermatitis resulting from hair dye the suggestion of Andrews of the employment of compresses of sodium hyposulphite (1 to 3 per cent) is of great benefit.

Eye shadow.—Reactors to mascara and the various eye-shadow preparations occur often. These lampblack compositions, made up in pencil waxes or as eyelash paints are true causative factors in producing the cosmetic eye.

Eyelash curlers present another hazard. In one case the rubber pad and not the nickle instrument itself kept up a low-grade blepharitis. Chronicity occurred because the patient preferred curls to cure, despite warning against continued use.

Eye-drops.—A patient of my colleague Dr. Cormia developed a cosmetic eye from the employment of proprietary eye drops. She was a known mercury-sensitive case, having reacted to bichloride while nursing. Patch-testing to the eye drops, the stated content merthiolate, and bichloride gave, in all three instances, positive results. The interesting feature was that the patch-test made on the arm was negative, while that done near the eye tissues proved strongly positive.

Reactions to belladonna eye drops frequently occur in the ophthalmological service.

Nail polishes.—Nail cosmetics, of which there are legion, present skin hazards. Contact of the painted or treated nails with eyelids occurs, quite unconsciously, more commonly than one would suppose.

Tooth paste.—Dr. Cormia and the writer have each observed a fixed type of eruption involving periocular and circumoral tissues due to erythrosine used as a colour and preservative in tooth paste.

METHODS OF INVESTIGATION

The discovery of the causative agents in cases of periocular dermatitis and the treatment necessary present a difficult problem to the dermatologist. He must exhibit technical wisdom and infinite tact in managing both patient and relatives.

I. Do a physical examination, and certainly include a urinalysis, for the swollen eye always denotes kidney trouble to the layman. Then clear up the myth concerning acid in the blood.

II. Proceed with a questionnaire and tabulate the answers, for cause and effect are not always apparent. Cross-examine lady patients; check and re-check their answers, for the feminine mind has many blanks.

QUESTIONNAIRE:

1. Concerning food indiscretions or drug ingestion, to include laxatives, headache remedies or sedatives.
2. Hair restorers, dyes, scalp and dandruff remedies, eyebrow pencils, shades, eyelash applications, curlers, eyedrops (both cosmetic and medical).
3. All possible contacts—clothing, cosmetic, domestic—with trade and hobby factors.
4. Cosmetics only occasionally employed.
5. Cosmetics used by other members of household or by intimates.

III. Confirm known formulæ, for manufacturers often change ingredients without notifying the public, and new combinations may occasion unexpected reactions.

IV. Proceed with patch-tests after the acute dermatitis has subsided. It is advisable, at first, to make these tests on the arms or the V of the neck. For more precise testing, re-apply suspected materials on the sensitized skin—near the eyes. Read tests at the 24 and 48-hour intervals.

TREATMENT

Acute stage

Proceed along the therapeutic route with caution and employ only soothing applications at the onset of treatment.

1. The old-fashioned starch poultice, applied warm or cold.

2. Compresses of aq. ichthyol. 1 per cent, or Liq. Alumin. Acetat. 0.5 per cent, reduce the œdema and relieve the itching.

3. An oily calamine emulsion applied to the eye tissues with a fine camel-hair brush gives comfort.

Sub-acute stage

4. One-half per cent sulphur and salicylic acid in an albolene base is helpful. Watch for sulphur burns. Reactions would seem to be more frequent from its use than from the employment of the included salicylic acid.

Chronic stage

5. X-ray is helpful. Sub-fractional doses of unfiltered radiation, equivalent to 50 - R. every 5 days for 4-6 doses, reduce the brawny thickening and relieve the itching and redness. No damage need be feared if this dosage is maintained. The eye is x-ray resistent, and shielding of the eyebrows is rarely necessary when one keeps under an epilation dose.

General means

1. Treat all areas of associated seborrhœa. No cure can be hoped for until the seborrhœic foundation is corrected.

2. The morale and general health must be maintained. Clear out focal infections. The patient must be assured that the senile look caused by wrinkling and pigmentation will be removed.

3. Use nerve sedatives with caution. Unfortunately, the ideal dermatological sedative has not been found. Shun the barbiturates; if absolutely pressed for a sedative exhibit the bromides judiciously. Benefits to the ruffled nervous system may be offset by side irritation effects on the skin. A proprietary bromide and calcium combination, given by the intravenous or oral routes has worked best in our hands. As a routine, feed B concentrate for its beneficial action.

4. Keep your patients off the seven Cs: cocktails, coffee, condiments, cigarettes, carbohydrate, chocolate, and all cosmetics, of course, until you are sure of their innocence. All of these, in their particular ways, provoke existing lesions. Watch the patients who may try—*just once again*—to use the offending product that so nicely matches costume or mood. A second flare is generally enough to convince them to leave the irritant alone. Allow the use of new cosmetics; these, apparently, are necessary to maintain modern life. Prescribe the non-allergic types but, first of all, make sure they are suitable by skin patch-tests.

With continuance of the condition suspect the dermatological agents employed; even bland substances such as olive oil, vaseline and glycerine at times are not innocuous.

Acknowledgment is made to Goodman's Cosmetic Dermatology for technical cosmetic information.

SOME ASPECTS OF THE NEO-NATAL MORTALITY RATE*

BY C. K. ROWAN-LEGG

Ottawa

ALTHOUGH there has been a very striking reduction in the mortality for infants under one year of age since the turn of the century, and especially during the past twenty years, there has not been a very marked drop in the mortality for infants under one month of age, and it would appear that herein lies the greatest opportunity to save infant lives today. In Canada, 1937, the last year for which figures are available, the infant mortality rate was 76 per thousand live births and the neo-natal mortality was 34 per thousand live births.

While this problem may seem to be more in the domain of the obstetrician than the pædiatrician, nevertheless we are frequently called upon to care for infants in the neo-natal period and therefore should work hand in hand with the obstetrician in an effort to reduce the neo-natal death rate to the so-called unpreventable minimum, estimated at 3 to 4 per cent and due chiefly to malformations. While one would assume that the general improvement in the public health education would produce healthier babies from healthier mothers, with a resultant drop in the neo-natal mortality rate, such has not been the case.

There are two factors beyond the control of the obstetrician which increase the hazard to the child, firstly, a relative increase in first-born

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children due to a general decrease in the birth rate from 24.7 in 1926 to 19.9 in 1937; secondly, the increased age of women bearing children for the first time. It is a known fact that prematurity is more common in elderly primiparæ, and Nathanson and Roeder have shown a greater number of complications of pregnancy and labour and an increased incidence of operative deliveries in women over 35 years of age.

There are three factors which are said by some to account for a certain number of our present neo-natal deaths and which are the problems of the obstetrician, namely, the use of anæsthetics and analgesics, the effect of which on the premature infant especially we know little; the increasing operative trend; and the widespread use of posterior pituitary extract.

It is common knowledge that the urban neo-natal mortality rate is higher than the rural, and this fact is used often by those who would blame modern obstetrical practice for failure to reduce the present death rate. However, I think that possibly some of this difference in rate may be due to the fact that many rural cases with complications are sent to hospitals, that there is probably a higher percentage of multiparæ in rural districts, and that on the whole women in the country probably marry younger.

It is difficult, as pointed out by Bonar, to obtain reliable statistical information regarding neo-natal mortality, because the International List of Causes of Death is so vague that a given condition may be filed under a number of headings, and there is also the question of our carelessness and ignorance of the factor responsible in certifying deaths. To help us certify accurately there is need for a greater number of post-mortems on newborn babies, and these post-mortems must be done with great thoroughness, as we know neo-natal pathology differs from that in older infants. If we have a better knowledge of what to look for some causative factor may be found which might otherwise escape us.

Bonar suggested the simple pathological classification as used by Cruikshank in his study of 800 neo-natal autopsies. This classification was:

1. Birth-effects (asphyxia, atelectasis, injuries, prematurity) ..... 67 per cent
2. Infective conditions ..... 30 " "
3. Gross congenital malformations .... 3 " "

He listed the deaths from hæmorrhagic conditions under the infections, and this would undoubtedly be under a separate heading.

If we attempt to group the neo-natal deaths as reported in Canada for the year 1937 under these headings we find approximately the following picture. (1) Birth-effects: injuries, 11 per cent; prematurity, 41 per cent (total, 52 per cent). There were no cases listed as dying from asphyxia or atelectasis as the primary cause. (2) Infective conditions, 21.6 per cent. (3) Gross congenital malformations, 10.4 per cent. The remaining 16 per cent were listed under such headings as congenital debility, convulsions and ill-defined causes.

Most of the deaths under the heading of birth-effects are due to ante-natal and natal effects rather than to post-natal, and many of them must be considered to be preventable. A very large percentage occur in the first few days, and most of these are associated with signs of asphyxia which may be due to asphyxia alone or associated with intracranial hæmorrhage. The theories as to the causes of asphyxia in the newborn are numerous, especially in those infants considered viable at birth, and in view of the work of Snyder and Rosenfeld and Bonar dealing with intra-uterine respiratory movements is it not possible that many of these cases have their origin in an upset of this intra-uterine respiratory rhythm as the result of prolonged or difficult labour or even, possibly, the present day generalized use of anæsthetics and analgesics? It is interesting to note that Bundesen and his co-workers found 20 per cent of the deaths from asphyxia were in infants delivered by Cæsarean section.

In microscopic examination of the lungs of infants dying of pulmonary collapse the common finding is masses of cellular and amorphous debris in the alveoli, respiratory ducts, and terminal bronchioles, and this resembles the solid elements of amniotic fluid. Paterson and Farr and others suggest that this amniotic fluid debris is potentially an obstructing mass in infants who show an inadequate respiratory movement at birth, and they present evidence to show the collapse is the result of absorption of alveolar air entrapped distal to the point of obstruction by the amniotic fluid debris. This theory of obstruction is the same as that used to explain the post-operative collapse in adults, and recent work on this complication has had to do with the effect of helium gas, a substance which is very diffusible due to its lightness but not rapidly absorbed as is oxygen, thereby tending

to keep the alveoli distended even if there is a block in a terminal bronchiole. I wonder whether the routine use of this gas in the newborn might not help to prevent many of our present cases of pulmonary collapse?

Of the 52 per cent of neo-natal deaths in Canada during 1937 falling under the heading of birth effects 11 per cent were due to injuries, the most common of which is no doubt intracranial hæmorrhage, this condition being found in 20 per cent of Cruikshank's cases under the same heading, and we must consider these as preventable deaths.

Prematurity accounted for 41 per cent of the neo-natal deaths, and here is our greatest problem. The main causes of death in premature infants as found at autopsy in a series of 243 cases reported by Bundesen from Chicago were as follows:

Cerebral hæmorrhage	23.0 per cent
Pneumonia	7.8 " "
Malformations	7.4 " "
Asphyxia	3.7 " "

No demonstrable pathological lesion was found in 45 per cent, and under this heading are two sub-groups: (*a*) Viable infants with marked atelectasis, 12.3 per cent; (*b*) infants showing marked immaturity or born of mothers with pathological conditions, 33 per cent. These figures show, first, the need for skilled obstetrical delivery of premature infants, and, secondly, the need for intensive study of the physiology and pathology of these infants, especially that concerned with the respiratory system. As Bundesen and his co-workers state, "Further studies are needed to determine what factors produce death in viable premature infants". Possibly some pathological lesion not yet demonstrated by methods now known may be a factor that contributes to the deaths in this group. Another factor of importance is the maintenance of body heat in those infants born at home and later transferred to hospital. It is common knowledge that there is a higher death rate among those born at home and later transferred to hospital than in that group born in hospitals.

Deaths from infection accounted for 21.6 per cent of our neo-natal deaths, and of this number 16.2 per cent died of pneumonia and 18.6 per cent of enteritis. The deaths from infection are closely linked with the effect of birth, especially those tending to maintain atelectasis or asphyxial conditions in general. As is well known, the partially expanded lung is particularly liable to pneumonia. Therefore, when we gain a better knowledge of atelectasis and reduce its incidence we will at the same time reduce the deaths from pneumonia. Another important factor, and one which I do not think is sufficiently stressed to most mothers, is the danger of infection from other children in the home and from the numerous friends and relatives who insist on mauling every newborn infant.

Congenital malformations accounted for 10.4 per cent of the neo-natal deaths in Canada in 1937, this figure being much higher than that found in post-mortem examinations as reported by Cruikshank, who gave a figure of 3 per cent. Probably many of the cases labelled congenital heart disease are actually asphyxia and intracranial hæmorrhage. The greatest number of malformations involve the central nervous system, congenital heart disease accounting for very few. In 200 autopsies on stillborn infants McGuiness, of Winnipeg, found only three cases of congenital heart disease.

As a means of trying to reduce the present neo-natal death rate the following suggestions are put forward.

1. Closer co-operation and study of the problem with the obstetrician.

2. A more intensive educational program to acquaint prospective mothers with the necessity of regular prenatal care, and the establishment of facilities for such care where they are lacking at present.

3. It would be helpful to the obstetrician and pædiatrician if the international list of causes of death was revised so as to conform more closely with the findings commonly seen at autopsy.

4. An earnest effort on the part of physicians to certify deaths correctly, so that our figures will give a more accurate picture of the problem.

5. A greater effort to obtain more autopsies, these, too, studied in great detail in an effort to learn more of neo-natal pathology.

6. It might be of some assistance to the pædiatrician if we were called in earlier, especially in cases of prematurity, so that these cases could be studied in more detail.

STUDIES WITH A NEWER ANÆSTHETIC: ETHYL N. PROPYL ETHER*

BY W. EASSON BROWN, M.A., M.B., DIPLOMA IN ANÆSTHESIA, R.C.P. & S. (ENG.)

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SOME years ago, in the Department of Pharmacology of the University of Toronto, we undertook to determine whether di-methyl ether might be used as an anæsthetic for surgical operations on the human subject. We found at that time that it caused considerable congestion, some cyanosis, and difficulty in breathing. It appeared to possess all the disadvantages of ordinary di-ethyl ether, and at the same time did not have its anæsthetic value.

Since that time the thought has been present that a more suitable agent might be found, particularly for reinforcing gaseous mixtures, which would combine to a greater or less degree the safety of ether and the potency of chloroform. In 1932 Amiot, of Paris, reported that certain of the higher ethers apparently possessed varying degrees of anæsthetic value, but indicated that considerable research would be necessary before any should be adopted for clinical use. It would seem from the experimentation we have carried out that some strides have been made in this direction. The work done so far has been purely of an experimental nature with no clinical background. I am therefore presenting to you the results of our experiments in the hope that, as the substance becomes available for clinical observation further progress may be made.

The substance I wish to report on to you today is known as "ethyl N. propyl ether". This ether was made for us through the kindness of Prof. F. R. Lorriman, of the Department of Chemistry of the University of Toronto, by the Williamson ether synthesis method. In this reaction ethyl iodide was made to act upon sodium N. propylate. This sodium N. propylate is a solid, being made from N. propyl alcohol and sodium. It must be made in an excess of alcohol, which is later distilled off. The ethyl iodide is slowly added under a reflux to the sodium propylate. The whole is refluxed for several hours and any crude ether distilled off. It is freed from halides by shaking with aqueous silver nitrate solution, dried over a suitable drying agent, and fractionally distilled. By this method a large percentage of iodine can be recovered as sodium iodide, thus making the possibility of commercial preparation fairly reasonable in cost.

Ethyl N. propyl ether is a liquid at ordinary temperature and pressure. It boils at 63.6° C. and has a specific gravity of 0.75. It has a so-called ethereal odour which is not unpleasant. In anæsthetic concentrations it does not have the more or less suffocating effect of di-ethyl ether. It appears to cause no bronchial secretion or salivation; it produces no change in the arterial tension, and anæsthesia seems easily maintained.

Our preliminary experiments were made in a specially constructed bell jar resting in a mercury ring for purposes of sealing the jar. This jar, having a volume of about eight litres, contained a sufficient amount of soda lime to absorb any excess of CO_2, and an inlet valve through which any desired flow of oxygen could be admitted, the amount being regulated by an attached respirometer. The floor of the jar was composed of insulated sections of wire netting, each section being connected with an electrical device whereby induction shocks could be given to the animal no matter on what sections of the netting he might be resting. The anæsthetic was introduced from a small electrically heated vaporizing chamber. Our first experiments were done with white rats. These small animals were introduced into the jar and ethyl N. propyl ether admitted in small quantities. We found that from 4 to 5 per cent was sufficient to cause the rats to lie quietly on the netting, the electrical shocks causing no response.

We then followed this by work on cats. The cats were anæsthetized with a 25 per cent cyclopropane mixture with oxygen, and while under this anæsthetic were prepared for the recording of respiration and blood pressure. The cats were then connected with a respirometer into which oxygen and vaporized ethyl N. propyl ether could be introduced. With this prepara-

* A paper read at the Seventieth Annual Meeting of the Canadian Medical Association, Section of Anæsthesia, Montreal, June 21, 1939.

tion cats were kept anæsthetized for periods up to one hour and fifty minutes. The first signs of overdose were definitely respiratory in character. Up to the time of the complete cessation of respiration the blood pressure and heart rate or regularity did not appear to be affected in any way whatever. Only after some minutes of apnœa did the blood pressure show any tendency to fall, and then only slowly. A removal of the mixture at this time and a few compressions of the chest of the animal caused a resumption of breathing and an immediate return to the normal blood pressure. In none of our experiments did we cause the death of the animal by overdosage, as the lessening and slowing of the respiration gave a very adequate warning, so obvious that it would be impossible to disregard it. The death of the animals in our experiments was caused by the removal of the heart and lungs while still anæsthetized for purposes of examination. In no case did there appear to be any sign of damage or atelectasis.

Following these experiments ethyl N. propyl ether was inhaled in the laboratory, using a metric gas machine with CO_2 absorption technique and a specially constructed ether container so as to conserve the ether, as the supply was limited. Oxygen only was used to convey the ether vapour. The ether was not unpleasant to inhale, there was no feeling of suffocation, and the induction was marred by no unpleasant symptoms. Blood pressure and pulse rate were unchanged during the inhalation. The ether was inhaled to the stage of unconsciousness and the loss of pain reflex. The recovery was remarkably fast. The ether was purposely taken within two hours of a full meal but no nausea or vomiting followed. Sitting up took place within five minutes of the removal of the anæsthetic. There was some feeling of dizziness but this was not marked. Within ten minutes of the cessation of the anæsthetic a cup of tea was taken and a cigar smoked. Within twenty minutes a motor car was driven safely through the five o'clock traffic of Toronto, and within two hours a hearty meal was eaten with good appetite. These facts are mentioned not to claim any immunity from nausea or vomiting but to show that there seems to be some grounds for claiming a considerable reduction in disagreeable after-effects. During the hour and a half following the inhalation there was certainly some feeling of being off colour but not sufficient to prevent one carrying on in a normal fashion. One outstanding fact was the very fast return to normal mentality.

It would seem from the foregoing facts that the study of ethyl N. propyl ether should be continued. Because of the ease of administration, the apparent excellence of the anæsthesia, the very unusual safety factor, and the lack of unpleasant after-effects it might well be considered the equal of and possibly to surpass the generally used volatile anæsthetics, and so introduce into the realm of anæsthesia an agent combining potency and safety in a manner so far unknown to the anæsthetist.

I wish to pay tribute to the unfailing and valuable assistance rendered by Prof. Henderson both in advice and the putting of the facilities of his laboratory at my disposal. Without his personal supervision the carrying out of the work would have been very difficult.

Child-bearing actually improves a woman's figure instead of ruining it, unless she uses it as an excuse for lazy posture. The maternal figure is usually better than that of the woman or girl whose lines are not completely developed by maternity, for the latter is likely to have hips too large in proportion to the waist. "The female body is a series of three ovals increasing in size from top to bottom. It stands to reason that the body is easier to carry around if these ovals are balanced on top of each other with the centre of gravity directly under all, than if one were wobbling out in front and one sticking out behind." Keeping down the body weight to a normal gain during pregnancy is an important factor in maintaining a good figure afterward. Although many women use pregnancy as an excuse to develop an uninhibited appetite twice the number of calories previously eaten is not necessary, nor is twice the amount of carbohydrates and fat. The pregnant women should "eat for two" only in respect to protein and the protective foods, such as minerals and vitamins. It isn't necessary for any woman to gain more than 15 or 20 pounds above her normal weight. Keeping the weight down during pregnancy will eliminate the necessity of dieting after the baby is born, when the infant needs more than ever, an adequate diet on the part of the nursing mother. — Charlotte R. Welsh, *Hygeia, The Health Magazine*, March, 1940.

GIANT FOLLICULAR LYMPHADENOPATHY

BY CHARLES POWELL

Port Arthur, Ont.

THIS is a recently recognized form of disease that is of interest mainly to the pathologist, but when the deep glands are the first affected may present considerable difficulty in diagnosis. Giant follicular lymphadenopathy is easily recognized histologically, and is a condition characterized by a numerical and a dimensional increase in the follicles of the lymph nodes (with enlargement of the spleen in many cases).

The condition was first described by Brill, Baehr and Rosenthal[1] in 1925. Symmers[2] has recently collected some thirty odd cases, and has contributed much to our knowledge of this condition. He points out that the cases are separable into two groups—first, those in which the enlarged follicles remain as such for months or years; or the nodes may become small and disappear for a period, only to return again; or they may break down and discharge a thin fluid, then heal and disappear; second, those cases which become transformed into (*a*) a polymorphous cell sarcoma; (*b*) Hodgkin's disease; (*c*) lymphatic leukæmia. This is extremely interesting and suggests that the last word has not yet been written. Some observers maintain that this condition, although at first benign, will eventually become malignant, while others do not accept this view. One of the cases herein reported (if the history given me by the patient is correct) rather favours the latter opinion.

CASE 1

Mr. K.A., aged 55, a patient of Dr. R. C. Bull, Fort William. This man is a returned soldier. He first noticed two lumps on the back of his neck in 1914. These came on while he was in a military training camp. They remained for a matter of a few weeks, then disappeared. Then again in 1917, while in France, the same posterior cervical glands became enlarged. They were not painful and after several weeks the glands on the left disappeared, but on the right one remained till removed by Dr. Bull in 1938. A histological report on this one proved it to be giant follicular lymphadenopathy.

From the duration of this case (over twenty years) and the fact that it remained quiescent all this time one may say the condition is benign.

CASE 2

Mrs. J.O., aged 38, a 2-para.; weight, 102 lbs. Menstruation ceased at the age of 35. Urinalysis, negative. Blood examination, negative. This patient complained of some indefinite abdominal pain and constipation. X-ray examination of the colon with a barium enema was negative. Constipation was corrected and the patient enjoyed fairly good health for the following year. In June, 1935, she again presented herself complaining of intermittent digestive disturbances. A complete gastric series was done, but this did not disclose any lesion. She complained of low-down backache. X-ray examination of the spine and pelvic bones was negative. For the next two years the patient did not enjoy good health. She complained of insomnia, epigastric pain, and weakness. She could not walk more than three blocks without becoming exhausted.

In August, 1937, on palpating the abdomen, one could make out what seemed to be enlarged glands in the upper left abdomen. These were not tender on pressure, and were in a group, but discrete. In February, 1938, these glands had increased in size and were easily palpable. At this time an exploratory operation was done and three or four of the glands were removed. They were retroperitoneal, situated behind the stomach, and varied in size from a grape to a large walnut. The wound healed promptly and the patient felt better. Her appetite improved and the gastric distress left her for a time.

The histological report of these glands proved this to be giant follicular lymphadenopathy. In October, 1938, the patient was again examined, due to a return of her digestive disturbances, and at this time another group of glands was palpated from about the same region from which the first had been removed. The patient was then referred to a large clinic for advice and treatment. She was again operated on and some preaortic glands were removed. About one month after her return home another group of glands could be felt within the abdomen. This mass increased in size rapidly and in a short time measured roughly about five by six inches.

In December, 1938, some new glands appeared in each groin. This latter group was quite large and tender, and it first looked as if they would break down. In February, 1939, x-ray therapy was advised and the patient was sent away for treatment. After about six weeks of deep x-ray therapy the large mass of abdominal glands as well as the superficial glands in the groins and axilla completely disappeared. At the beginning of her illness there was some enlargement both of the spleen and of the liver. After her x-ray treatment both these viscera seemed to have returned to normal.

At no time during her illness was there any anæmia or any disturbances in the normal blood picture. The patient for the last three months has enjoyed excellent health.

The prognosis is extremely difficult. As long as the glands remain radio-active we hope to keep them under control. These two cases herein reported may both belong to the group where the morphology of the glands does not change. From our present knowledge, however, time alone will be the deciding factor.

Deep x-ray therapy is the only effective treatment, and these patients should have the treatment repeated at three months' intervals.

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Case Reports

POST-OPERATIVE PARATHYROID TETANY TREATED WITH DIHYDROTACHYSTEROL (A-T-10)*

BY LEYLAND J. ADAMS, M.D., F.R.C.P.(C.)

Montreal

Dihydrotachysterol is derived from tachysterol, one of several sterols obtained from ergosterol by irradiation with ultra-violet light. It is available on the market under the name of A-T-10, in the form of a clear oily solution, and is effective when taken by mouth. The use of dihydrotachysterol for the treatment of post-operative parathyroid tetany was introduced first by Holtz[1] in 1933. Since then it has been used extensively in Germany.[2] In England, Snapper[3] in 1934, and Campbell[4] in 1935 reported successful results. Arnold and Blum,[5] Swinton,[6] MacBryde,[7] Margolis and Krause,[8] Rose and Sunderman,[9] and others have recently reported on its use in the United States. Albright and his associates[10] have shown that the chief effects of A-T-10 are an increased absorption of calcium from the intestine and an increased excretion of phosphorus in the urine. They concluded that the changes in the blood were secondary to these fundamental actions.

The following case of post-operative parathyroid tetany is reported because of the dramatically efficacious control of signs and symptoms by means of A-T-10.

REPORT OF CASE

Mrs. K., a 43-year old Canadian housewife, was admitted to the Montreal General Hospital on November 16, 1938, complaining of palpitation of the heart, nervousness, dyspnœa on exertion, loss of weight, and a lump in her neck. These signs and symptoms dated back five years to the time of her last pregnancy. Since that time she had always been weak and unable to do her usual work. About 4 years previous to entry she had noticed shortness of breath on exertion and palpitation. Nine months before admission she had become very nervous and irritable. During this time her weight declined from 194 to 161 pounds. Her medical history prior to 1933 was essentially negative. The family history was irrelevant.

Physical examination.—The patient was well nourished. She was extremely restless, fidgety, flushed, and was sweating, and her breathing was laboured. There was no exophthalmos and the movements of the eyes were normal. There was a moderate tremor of the tongue and hands. The thyroid gland was palpable and showed a uniform diffuse enlargement. No definite nodules were felt. A loud bruit was audible over each lobe of the thyroid. There was marked tachycardia, the pulse rate averaging 112 per minute. The heart was normal in size, and the sounds were rapid but clear. The blood pressure was 170/70.

Urinalysis, determinations of hæmoglobin, erythrocyte and leukocyte counts, and the Wassermann and Kahn tests gave negative results. The plasma cholesterol was 151 mg. per cent. Roentgenograms of the chest revealed some cardiac enlargement, but were otherwise normal. An electrocardiogram showed a rate of 100 per minute with a left axis deviation and a diphasic T in lead I. The basal metabolic rate was plus 80.

A diagnosis of Graves' disease was made and treatment with Lugol's solution, 10 minims three times a day, was instituted preparatory to subtotal thyroidectomy. The treatment otherwise consisted of rest in bed, digitalis, gr. 1½ daily, a high caloric diet, and sedatives as required. After thirty-six days of the above treatment the signs and symptoms improved and the basal metabolic rate dropped to plus 51.

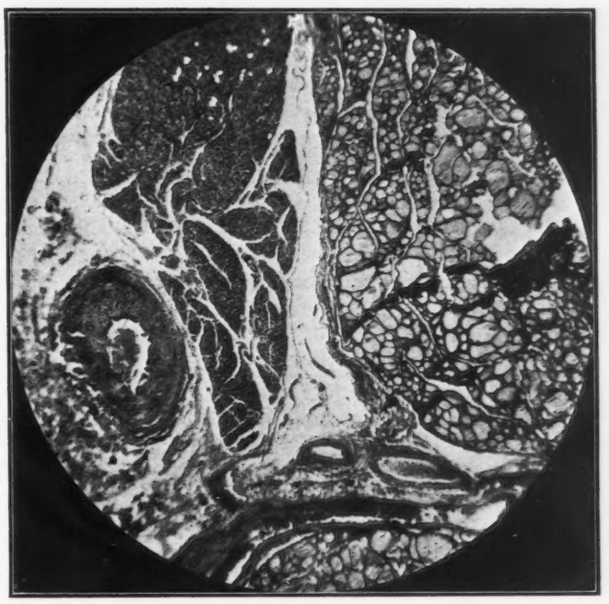

Fig. 1. — Photomicrograph showing the parathyroid tissue lying between the thyroid on the right and an artery on the left.

A subtotal thyroidectomy was performed on December 23, 1938. The greater parts of both lateral lobes were removed. A small remnant of thyroid tissue was left in the tracheo-œsophageal groove on each side.

The pathological report showed typical heterotrophic adenoid goitre (Fig. 1). Parathyroid gland tissue from two glands was also found.

Post-operative clinical course. — Two days after operation tetany manifested itself by stertorous, noisy breathing and carpo-pedal spasm. The blood calcium was found to have dropped from the normal 10 to 12 mg. per cent to 5.5 mg. per cent. Calcium gluconate was given by mouth. Five days after operation parathyroid extract intramuscularly was started and continued at intervals of a few days because of numbness and tingling of the extremities, carpo-pedal spasm, and abdominal cramps. She was discharged to her home in the

* From the Medical Service and Pathological Department of the Montreal General Hospital. Presented before the Montreal Medico-Chirurgical Society, December 1, 1939.

country on January 18, 1939. At that time the surgical wound had healed, the basal metabolic rate had fallen from plus 51 to plus 17, and the serum calcium had risen to 7.7 mg. per cent. The following treatment was to be carried out: Lugol's solution, 3 minims, digitalis, 1½ grains daily, cod liver oil, 4 drams t.i.d., and calcium lactate, gr. xxx t.i.d.

Two weeks after her discharge, February 1, 1939, she was re-admitted to hospital complaining of twitching and stiffness of all her muscles, spasm of the fingers, fatigue, and nervousness. While at home on her farm she had had a convulsion requiring parathyroid extract.

On admission the clinical signs were those of increased neuromuscular excitability. Chvostek's and Trousseau's signs were positive. There were no indications of hyperthyroidism, myxœdema or cataracts. The treatment consisted of a low phosphorus diet, 12 grams of calcium gluconate, 4 grams of ammonium chloride daily, cod liver oil, 2 drams, and viosterol, 1 dram three times daily by mouth. After two weeks of the above treatment the symptoms of tetany continued practically unabated and there was no change in the blood calcium and phosphorus levels (see Chart 1).

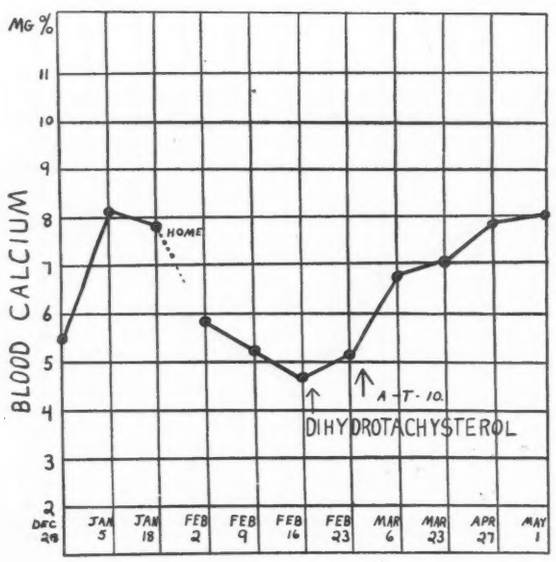

Chart 1.—Showing rise of blood calcium. First curve following parathormone, the second following dihydrotachysterol.

On February 14, 1939, the cod liver oil and viosterol were discontinued and dihydrotachysterol (A-T-10) 1 c.c. daily by mouth was substituted. A few days later the dose was increased to 2 c.c. daily by mouth (see Fig. 1). Within two weeks the serum calcium rose to 6.8 mg. per cent and the phosphorus fell from 6.3 mg. to 3.7 mg. per cent, and the symptoms and signs of tetany disappeared completely. She was discharged on May 3, 1939, and has been maintained in reasonably good health on small doses, 1 c.c. of A-T-10 twice a week since that time. When last seen December 1, 1939, nearly one year after her operation, she was well and able to carry on her work on the farm.

COMMENT

Parathyroid tetany is reported to occur in 0.5 to 1.5 per cent of the cases upon which a subtotal thyroidectomy has been performed. When it does occur the standard treatment by feeding calcium and vitamin D may not be sufficient to control the symptoms. Parathyroid extract is practically inert when given by mouth. Repeated injections are generally considered unsuitable for prolonged administration since the drug depletes the bones of calcium and tolerance to its action frequently occurs.

Dihydrotachysterol exerts a specific and profound influence on the concentration of calcium in the blood. Like parathyroid extract dihydrotachysterol causes a rise in the calcium level of the blood, and this effect is much more prolonged, the action of a single dose extending at times over many days.

Recently Albright[11] devised a quantitative test for the presence of calcium in the urine. The Sulkowitch reagent*[12] which he employs, is a solution containing oxalate radicals buffered at such a pH that when equal amounts of the reagent are added to urine the calcium will almost immediately come down as a fine white precipitate of calcium oxalate. He recommends adjusting the dose of dihydrotachysterol to maintain constant excretion of a moderate amount of calcium in the urine. This would indicate that the level of calcium in the blood is in the satisfactory range. He claims that by this simple test the danger of hypercalcæmia by over-dosage is minimized.

SUMMARY

The therapeutic effect of dihydrotachysterol in the control of parathyroid insufficiency and the literature pertaining to it are briefly discussed.

We have described a case of parathyroid tetany of severe grade appearing on the second day after subtotal thyroidectomy, and requiring parathyroid extract for control of symptoms. At least two parathyroid glands were proved by histo-pathological study to have been removed. Two weeks after discharge to her home in the country convulsions occurred, necessitating re-admission to hospital. Latent tetany, which had developed, was not controlled by the usual high calcium feeding and vitamin D.

A new drug, dihydrotachysterol (A-T-10) gave dramatic results, and proved entirely satisfactory in raising the blood calcium and controlling the signs and symptoms of tetany.

* Two and five-tenths g. of oxalic acid, 2.5 g. of ammonium oxalate, and 5 c.c. of glacial acetic acid are dissolved in distilled water and made up to a volume of 150 c.c.

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Clinical and Laboratory Notes

A SIMPLY CONSTRUCTED APPARATUS FOR MAKING SECTIONAL RADIOGRAPHS*

BY P. W. HARDIE, B.SC.(MED.), M.D.

Mountain Sanatorium, Hamilton, Ont.

The underlying principle of sectional radiography consists of the x-ray tube and x-ray film being in motion relative to one another throughout the exposure. With more simple apparatuses this means tube and film swinging with a rectilineal motion on a fulcrum. Densities in the plane of the fulcrum remain in focus throughout the exposure and cast a sharp image. Densities above or below that plane are in motion in relation to the film, and thus their shadow is wiped out just as the hand may be passed in front of the camera without casting an image. More complex motions, circular or spiral, as used in the machine devised by Kieffer,[1] are more efficient, but such a machine is so costly as to be out of the reach of most radiological departments.

For the past year at the Mountain Sanatorium we have had in use, a simple, cheap and relatively effective apparatus for making sectional radiographs. The designing of the apparatus was relatively simple, once the principles of the machine were understood, and it was built by Mr. Roberts, the x-ray technician, in the Sanatorium workshop and the cost was only a few dollars. The apparatus consists essentially of two hardwood bars, one (A) bolted to the floor beside the diagnostic table as a fixed upright between the tube stand and the table. The second bar (B) swings on a fulcrum in bar (A) and is attached at the top to the tube holder. At the lower end of bar (B) there is a slot which fits over a steel pin on the Bucky diaphragm carriage. Motion is obtained by pushing the tube carriage along the carriage rail. With motion the tube slides upward on its support, is turned so that the central ray is always directed at the film, and moves in a rectilineal direction along the table. The plate is meanwhile being pushed in the opposite direction, the pin riding up in the slot in bar (B). The Bucky diaphragm is also in motion, screening out secondary radiation. For a fulcrum a steel bolt is passed through drill holes in both bars. Several holes are drilled ¾ inch apart, and thus the fulcrum can be raised or lowered very simply. The plane of the fulcrum is the focal plane and thus sufficient adjustment of the fulcrum must be allowed to cover at least half the thickness of the body. Sections obtained are less than ¼ inch thick, while holes in the bars are ¾ inch apart. It is sometimes necessary to make sections between the levels represented by the holes in the bars. To overcome this difficulty a piece of ply wood ⅜ inch thick is placed under the patient raising him by that much and a new set of sections can be obtained. Thus sections ¼ inch or less thick and ⅜ inch apart can be taken at all depths in the body. The bar (B) is attached to the tube carriage by means of an iron bar (C) bolted on (B) and to the carriage. The apparatus should be of as rigid construction as possible, and moving parts should be greased in order that motion will be free and vibration reduced to a minimum. The Bucky diaphragm is cut in by an automatic switch. Bucky travel is set for one second and exposure lasts that long. The Bucky carriage must, of course, be movable.

The switch is of the butterfly type, and as the tube carriage is brought back into position before the exposure it lifts one arm of the butterfly and breaks the circuit to the Bucky diaphragm. The setting of the x-ray machine for the next exposure can then be carried out. As motion begins the arm of the butterfly switch is released and a spring closes the circuit and exposure begins. (Any competent electrician can easily make a similar device).

During the exposure time, usually one second, the tube carriage is pushed the required distance along the table. The technician stands behind a lead screen when making exposures. Due to

* Presented at the Fifty-ninth Annual Meeting of the Ontario Medical Association, Section of Radiology, Hamilton, June 1, 1939.

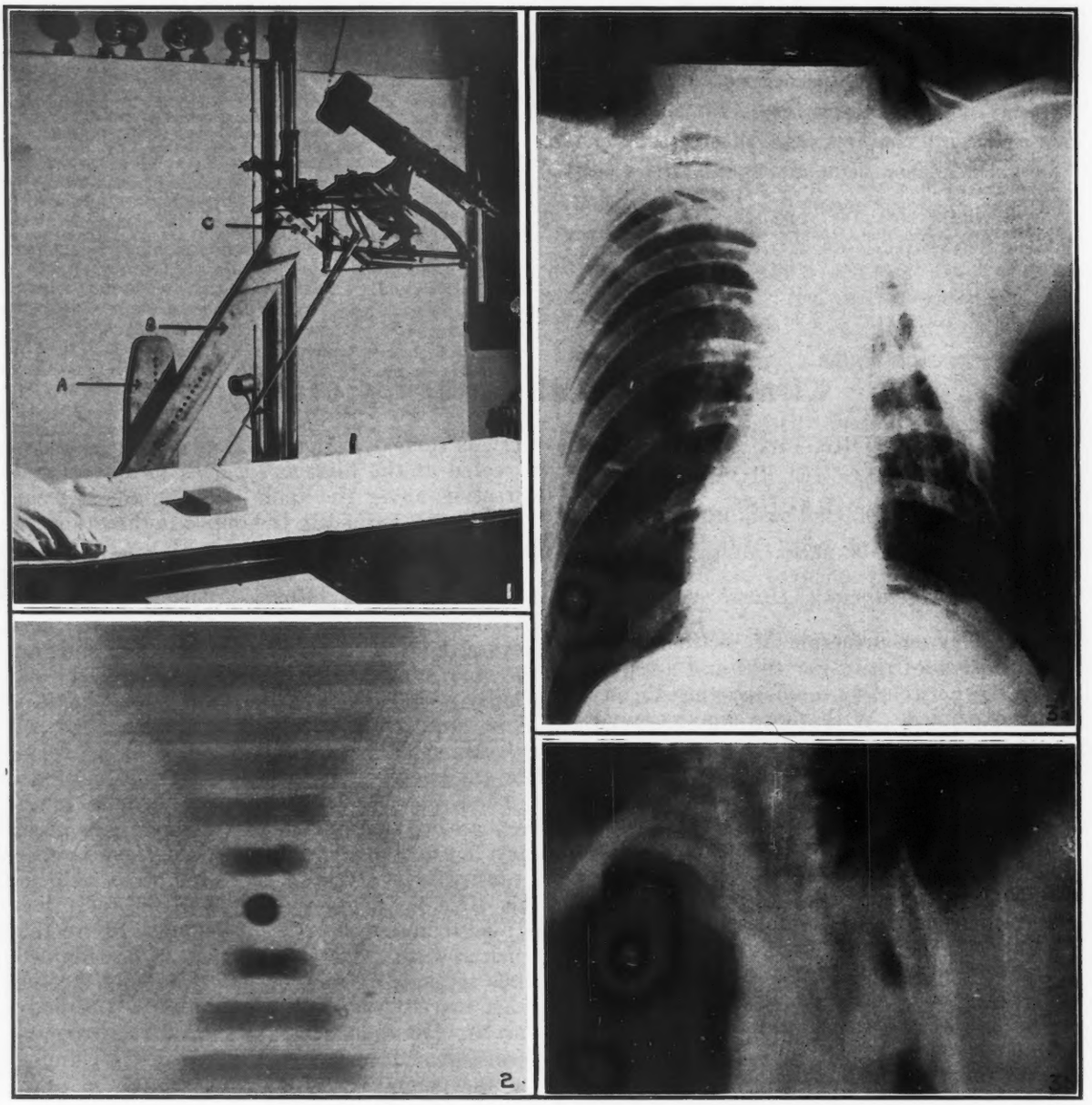

Fig. 1.—The apparatus. Note central ray as indicated by pointer directed at the film. A. Upright hardwood bar. B. Swinging hardwood bar. C. Iron bar attached to tube carriage. **Fig. 2.**—Radiograph of lead shot, at levels ⅜ inches apart. Note the sharpness of the shot in the plane of the fulcrum. **Fig. 3a.**—Radiograph of chest following thoracoplasty. No cavity seen. **Fig. 3b.**—Same case as Fig. 3a. Sectional radiograph outlines cavity sharply.

the counter-weighting of the tube there is very little resistance to motion and the apparatus can be shifted easily with one finger.

Sections less than ¼ inch in thickness can be obtained with the above described machine as it will allow a long effective travel. This long effective travel is due to the fact that the tube is turned and the central ray is at all times directed at the film. In the apparatus described by Twining[2] the central ray remains vertical throughout the exposure, effective travel is short, and sections necessarily thick.

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Therapeutics and Pharmacology

THE MANAGEMENT OF THE COMPOUND FRACTURED SKULL*

By William Oliver Stevenson

Hamilton, Ont.

The compound fractured skull is an acute emergency, and, as such, requires immediate treatment. Therefore its treatment must fall within the range of the work of a general surgeon. It is on this account that a short paper on this subject would seem desirable.

The physician who originally sees the case is faced with a responsibility of the first importance. Any success that a surgeon may have in the subsequent handling of these cases depends entirely on the treatment which the patient first receives. No attempt should be made to bathe or cleanse the wound on the scene of the accident. A simple sterile dressing or an alcohol dressing should be placed over the compound injury and bandaged tightly. Head injuries are exceedingly common these days, and in view of this fact every physician should have the necessary first-aid equipment in his car. No case of head injury should be moved until a posterior splint has been applied to the spine as well, for quite a number of cases occur which have an accompanying fracture or dislocation of the vertebræ. To move such a patient without his being splinted in the prone position would be to invite disaster by causing irreparable damage to the spinal cord. All cases of head injury should also be treated by immediately loosening all constricting clothing about the neck. The physician should also have in his bag an airway, so that free breathing can be obtained. These two precautions will prevent hypercongestion of the cerebral circulation, and will in this way minimize hæmorrhage within the skull. The patient should be transported to hospital as soon as possible and should be accompanied by the physician, who can give first hand information to the surgeon. It is very important for the surgeon to know at once the location of the wound, the nature of the wound, and whether or not meninges and brain substance are protruding.

In the emergency room of the hospital little should be done except, in the absence of the physician, to look at the nature of the wound. In most cases the physician's original dressings should be left intact until the patient can be taken to the operating room. Shock is sometimes severe, and it would be well to wait for an hour or two to counteract this condition. A small intravenous injection of 500 c.c. of 5 per cent glucose may be given, the patient kept warm, and other injuries of the body attended to. It has been our experience that these patients on admission to hospital are recovering from the effects of the concussion, even though their compound injury might be quite extensive. It would seem, therefore, that the bony cranium has received most of the force of the blow and that the underlying meninges and brain substance have only received the force of the blow after it is spent. This spent force, however, varies in degree so that its effects vary from a simple depression of the membranes to a severe laceration of them and the outpouring of brain substance, blood and cerebrospinal fluid. This quick recovery from concussion also leads us to believe that even in the severer cases the contents of the skull are merely squeezed out by the depressed bone and that the effects of the blow are not carried deeply within the brain substance. An x-ray picture will give us valuable information as to the extent, location, and depth of the depressed fracture.

The patient should be taken to the operating room as soon as possible. Urgency in dealing with these cases is of paramount importance, to avoid infection. Infection is very serious and may cause death from meningitis or meningoencephalitis, with herniation of the brain substance, and may leave in its wake some sequelæ, such as epilepsy, which would have to be dealt with by a neuro-surgeon. In the operating room the original dressings should not be disturbed until sufficient hair has been clipped or shaved from the area around the wound. The surgeon himself should deal with the preparation of the wound area, using several pairs of gloves if necessary, and he should follow the general principle of cleansing everything in a direction away from the laceration. Dripping solutions should not be used, for they would simply run into the wound and may carry infection with them. We have found alcohol sufficient for our purpose. It should be applied with swabs which are wrung out in the alcohol. Blood and exuded brain substance can be gently wiped away and loose shreds of meninges clipped off. The wound can then be draped and the operation proper begun. The wound should be enlarged, preferably in a vertical direction, so as to expose the whole area of depressed bone. Alcohol swabs can be used freely all through this inspection. Bleeding from the scalp can be controlled by forceps or by scalp clamps. The extent and depth of the depressed fracture can now be seen.

We have found that depressed fractures fall into two main types, first, the star-shaped, with the most depressed part in the centre, and, sec-

* Read before the Annual Meeting of the Ontario Medical Association, Hamilton, June 1, 1939.

ond, the triangular hinge-type depression, with one corner and two edges driven inwards. The star-shaped fracture should be dealt with by gently removing one of the fragments. This will give us the necessary room to inspect the meninges and brain substance beneath. If the meninges are intact they should not be opened, for they are a most efficient barrier against infection. It may be necessary to remove other segments of bone which are separated from the periosteum, but by gentle handling these bony fragments can be saved and elevated into their normal position. Sometimes it is necessary to elevate them in order to deal with the wound, but their periosteal attachment should not be interfered with. The hinge-type of fracture is more difficult to deal with. One has usually to rongeur away some bone at the side of the fracture before being able to insert the elevating instrument beneath the depressed portion so as to pull it out into position. One must be careful not to displace this fracture from the edge of the hinge and to try and deal with the underlying damage through the opening.

The depth of the wound can now be inspected and the use of a small suction apparatus is very valuable. It is advisable to remove only the obviously loosened brain substance. Remember that the brain substance is a very soft solid and that too strong suction may remove more than is necessary. Bleeding from the large veins or some small arterial branches may have to be controlled by very fine catgut, clips, or electric cautery. Capillary oozing can be controlled by compression with hot saline pledgets of cotton. The meninges should be spared as much as possible. Loose shreds which drop into the wound should be clipped off or turned out extradurally, so as to leave as smooth a surface as possible on the inside of the dura. As little as possible should be done to disturb the underlying structures. We have never inserted any fascia lata to replace destroyed meninges in these emergency procedures. At this stage we do not know whether we are going to get infection, and on this account we have limited our procedures to those which are absolutely necessary in removing the damaged brain tissue and meninges, controlling hæmorrhage, and replacing the bone in its normal position. We feel that in doing this we are co-operating with the natural forces of repair as much as we can.

The scalp wound is closed by silkworm gut or silk sutures passing through the full thickness of the scalp. A small rubber dam drain is inserted in the most dependent part of the wound, or through another stab wound, if necessary. This drain is carried down to the opening in the bone and, as a rule, is removed in from twenty-four to thirty-six hours. The dressing is applied and firmly bandaged. This firm bandage keeps the scalp close to the bone and resists any tendency to herniation of the brain substance through the wound. Our patient is then returned to bed, placed in semi-Fowler position, and receives the routine treatment of an ordinary case of head injury.

SUMMARY

The responsibility of the physician who first sees a case of compound fractured skull is outlined. All these cases should be looked upon as acute emergencies of the first degree.

Hospital treatment is outlined, not only in the emergency room but also in the operating room.

The steps necessary to avoid or minimize infection are emphasized.

A short description of the common types of compound fractures is given and their treatment indicated.

Dr. Figley reports sixteen cases of sensitivity to karaya or Indian gum and states that other instances have been previously reported. Some of the foods in which karaya gum may be found are gum drops, soft centre candies, prepared ice cream powders, certain brands of gelatin and junket, certain foods for diabetic patients, fillers for lemon and custard pies and some salad dressings. Many hand lotions and certain tooth cleansing agents also contain the substance. Karaya gum as sold commercially is a fine white powder with an odour somewhat like that of vinegar. It is entirely soluble in water, forming an adhesive mucilage. In India (where the gum tree grows) this gum is employed as a sizing agent in the calico printing industry. Karaya gum is collected from the bark of a tree of the Astragalus species (Sterculiaceæ). Sensitivity to the substance may manifest itself through breathing (hay fever and asthma), contact (skin eruptions) or swallowing (stomach upsets).—K. D. Figley, *J. Am. M. Ass.*, 1940, **114:** 747.

SOLDIERS' IDENTIFICATION TAGS.—"The identification tag that every soldier in the German army must wear around his neck will henceforth indicate the blood group to which he belongs (information necessary for blood transfusions)," the regular Berlin correspondent of *The Journal of the American Medical Association* reports in the February 24, 1940, issue.

Editorials

SEROTHERAPY AND CHEMOTHERAPY IN PNEUMOCOCCUS PNEUMONIA

THE advent of sulfapyridine at the time when the newer and more potent anti-pneumococcus sera were being tested in the treatment of pneumococcus pneumonias has complicated the decision as to which is the more effective for treating this disease, since it has meant the assaying of two agents rather than of one. The question has also arisen whether these two forms of therapy may be successfully combined or rotated. Any attempt at present to elucidate what the final answer will be is premature since further time must elapse before all the data are assembled and analyzed. Certain information is however available which will be of practical service to those anxious to give their pneumonia patients the most beneficial form of therapy.

We are indebted to Bullowa[1] in his Beaumont lectures for stating the case fully and impartially for serum therapy, and for indicating the pros and cons of this treatment as compared with sulfapyridine, and to Finland[2] for expressing some definite opinions on the application of these alternative methods of treatment and on the possible advantages of using them in combination. Their opinions, which seem to supplement rather than to contradict each other, are quoted freely in what follows.

In the case of serotherapy the present potent rabbit or concentrated horse sera have reduced the mortality of pneumococcus pneumonias of all types, with the possible exception of type III. The old idea that serum administration is useless if started after the second day is invalid, and more stress is laid on an adequate dose of serum being administered at whatever time the patient comes under observation, if late in the disease, the amount needed being correspondingly great. Nor is there any contraindication for administering serum to patients sixty years of age and over. The treatment is absolutely specific, and hence typing of the infecting pneumococcus is essential. This necessity for typing and the expense involved are said to be the greatest disadvantages in the use of serum as compared with sulfapyridine which acts on all types of pneumococcus and is inexpensive. Other handicaps listed for serum are the thermal and allergic manifestations which sometimes occur, the relatively long time consumed for administering, the amount of apparatus required, and the uncertain results where pus has formed, as in empyæma. Serum reactions occur much less frequently than formerly, and the Massachusetts Pneumonia Commission has demonstrated that serotherapy is a practical weapon in the hands of the general practitioner. These disadvantages, at any rate, cannot offset the dramatic effect of serum in rapidly alleviating the symptoms, and it is generally accepted that in adequate doses it neutralizes the specific carbohydrate, renders the patient immune, with resultant lowered mortality, and that once this neutralization has occurred through an excess of specific antiserum being present recrudescences are not likely to occur, as sometimes happens when sulfapyridine is stopped too soon.

The chemotherapeutic agent sulfapyridine certainly answers the main objections to the use of serum enumerated above, *i.e.*, it is easy to give and is not costly, but it has certain disadvantages of its own. Chief among these are the toxic manifestations which may be severe or even fatal, and proper control of treatment entails careful and frequent examination of the blood. A distressing nausea is so frequent and of such an objectionable character that patients are often hard to persuade to continue the drug. These toxic effects which show themselves on the blood, kidneys and liver are particularly likely to occur when treatment has to be continued for a long period of

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2. FINLAND, M.: *Canad. M. Ass. J.*, 1939, **41**: 554.

time. This is one of the clues for the general line of treatment recommended by Finland. He suggests that sulfapyridine should be administered as soon as the diagnosis is made (Bullowa stresses that this does not mean waiting for physical signs in the lung to appear but where there is good presumptive evidence of pneumonia from a history of fever, chills, and cough or sputum), and the sputum typed. If there is a prompt response to the sulfapyridine within 24 hours the chances are that the drug will only need to be administered for a relatively short time and hence toxic symptoms are not likely to occur. When there is no immediate response serum should be given at once. In those special cases where the prognosis is grave from the outset, *i.e.*, with extensive pulmonary involvement, in patients past the age of forty, where bacteriæmia is present, in pregnant women, and in alcoholics the combined treatment should be instituted as soon as the sputum is typed. Other cases in which serum is indicated include those with low white blood counts, liver or kidney disease, and with nausea and vomiting as prominent features.

It would thus appear that anti-pneumococcus serum still has a major part to play in the therapy of pneumococcus pneumonia, both in those cases in which sulfapyridine is contraindicated and also as an adjuvant to sulfapyridine in the severe types of cases enumerated above. We are fortunate to possess for the treatment of pneumococcus pneumonia two agents both of proved high efficiency, and it does not seem logical that one or other should be scrapped or even discounted simply because it entails certain obvious d sadvantages. There is a place for either or both in individual cases, and further experience will decide in what percentage of cases one or other will be the treatment of choice.

ARNOLD BRANCH.

INVESTIGATION OF CANCER REMEDIES

WE have received from the College of Physicians and Surgeons of Ontario a pamphlet dated January 18, 1940, containing, *inter alia*, an interim report on the activities of the Ontario Commission for the Investigation of Cancer Remedies. This is the second report of the Commission, the last being made as of December 31, 1938, and some idea of the volume of evidence collected at that time may be gathered from the fact that it occupied some 3,192 pages.

It is stated that the evidence regarding a number of these cancer remedies and methods of treatment does not justify further expense and investigation. In no case has the Commission been able to satisfy itself that any substance or method of treatment has been proved to be a cure or effective remedy for cancer.

We are struck with two things shown by this report: (1) the crude and often unreliable evidence which has been brought forward to support most of the claims; (2) the patience, fairness and thoroughness of the Commission in its investigations. In not a few cases the Commission was impressed with the confidence shown by patients in their testimony to the merit of various methods of treatment. But, on the other hand, it was sometimes impossible to conclude that the patient actually did have cancer; in other cases it was equally impossible to decide whether the relief or cure claimed was in fact due to the treatment under investigation.

Details are given of the various "cures" which have been examined. A rather curious argument was used in the case of one of these. The sponsor refused to divulge the nature of the secret remedy because, being a specific for all bodily ills, its disclosure would result in more harm than good to humanity, in that it would remove a powerful deterrent to wrong doing! But, apart from this ingenuity of idea, there was nothing in the list with which the Commission need ever reproach themselves for having refused to admit as being, possibly, of significant value. They have in a few cases cautiously concluded that further investigation should be made.

The whole report is too long for reproduction here. We think that all members of the profession, whether in the Association

or not, should receive a copy of it. So-called "cures" for cancer are painfully familiar to us, but we do not often see such fair-minded examination of their merits.

We would add that the College of Physicians and Surgeons of Ontario deserves great credit for taking the initiative in bringing about an authoritative investigation into this most important subject. It is to them that we owe the formation of the Cancer Commission. A limited number of copies of the Cancer Commission's report may be obtained on application to Dr. Robert T. Noble, Registrar-Treasurer, The College of Physicians and Surgeons of Ontario, 566 University Avenue, Toronto 2.

H.E.M.

Editorial Comments

Canada 1940*

We have just received an attractive brochure entitled "Canada 1940", the official Handbook of Present Conditions and Recent Progress, from the Dominion Bureau of Statistics, Department of Trade and Commerce, and published by the authority of the Hon. W. D. Euler, Minister of Trade and Commerce. This publication is the result of an effort to survey the current Canadian situation comprehensively but at the same time succinctly, in a popular and attractive form, and at a cost which makes possible its use in a wide extent. It is designed to serve two purposes. To those outside of Canada it will give a well-rounded picture of the Canadian situation from the Atlantic to the Pacific; in Canada itself it will help to provide a better basis for dealing with current problems.

There is an introduction dealing with Canada's war problem and economic considerations at the end of 1939, and a special article on the western oil situation. In addition there are nineteen chapters concerned with a wealth of topics of prime importance to Canadians. On pages 42 *et sequitur* is a brief statement, largely statistical, on public health, hospitals, and charitable institutions.

The book is attractive and freely illustrated, and there are two fine pictures in colour of Their Majesties, the King and Queen.

The price is twenty-five cents a copy, which small sum covers merely the cost of paper and press work. A special price concession of ten cents for one copy is made to teachers, *bona fide* students, and ministers of religion, since past experience has shown that considerable use has been made of this publication for educational purposes. "Canada 1940" is timely and will be of great value to all those who have the welfare of the Dominion at heart. A.G.N.

* Application for copies of this handbook should be addressed to the King's Printer, Ottawa. Postage stamps, it should be noted, cannot be accepted in payment.

"Air Raid Precautions, Handbook No. 3"

We are pleased to inform our readers that Reckitts (Oversea) Ltd., 1000 Amherst Street, Montreal, distributors of "Dettol" for the Montreal District, have secured from H.M. Stationery Office, a number of copies of the official booklet entitled "Air Raid Precautions, Handbook No. 3: Medical Treatment of Gas Casualties". The Company wishes it to be known that they are prepared to furnish gratis a copy of this publication to any registered medical practitioner who will ask for it. The booklet contains much valuable information for those who are contemplating going overseas, and, indeed, for those in civil practice.

FATAL ROAD ACCIDENTS IN BLACK-OUT.—In the British House of Commons on January 23rd Mr. Montague called attention to the road accidents, which, he said, were largely due to the black-out. Last month there were 1,200 deaths on the roads, 900 of which happened during the black-out. It might be estimated that in addition there were at least 30,000 injuries. During the last four months of 1939 4,123 persons were killed in road accidents. Captain Euan Wallace, in reply, said that the black-out was the main cause of the increase in the number of deaths from road accidents. From September to December, inclusive, 2,657 pedestrians died as a result of road accidents—an increase of 117 per cent over the corresponding period of last year. Taking account only of adult pedestrians, the percentage figure rose to 148. The Government had come to the conclusion, in view of the persistently high rate of accidents since the war, that if the thirty miles per hour limit represented a proper maximum limit in built-up areas in peace time, there was an overwhelming case for a general slowing down to twenty miles per hour in those areas during the black-out. The new speed limit of twenty miles an hour in the black-out would be introduced by an Order under the Defence Regulations, and would come into force on February 1st.—*Brit. M. J.*, 1940, **1**: 196.

Medical Economics

VI.

THE HISTORY AND PRESENT POSITION OF HEALTH INSURANCE DISCUSSIONS IN THE UNITED STATES

By Hugh H. Wolfenden, F.I.A., F.A.S., F.S.S.

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The analyses of the various governmental health insurance plans in Europe and Great Britain which were given in article No. V of this series brought out the conclusions, amongst others, that governmental compulsion in that field is essentially a European development, arising largely from special economic circumstances, and that the British method (for example) would undoubtedly require such extensive modifications before it could be introduced into Canada that it would be practically unrecognizable. The social-economic foundations of the United States and Canada are sufficiently alike that these same conclusions may be applied with equal force in the discussions of health insurance in the United States. It is not surprising, therefore, that controversies have arisen in that country also, and that differences of opinion are still so marked that health insurance was the one major problem which was omitted from the Socieal Security Act of 1935.

History of the Discussions until 1927

In order to comprehend the significant phases of the present situation in the United States it is important, as always, to review the history. The establishment of the compulsory system in Germany in 1883 was followed in 1891 by an international labour insurance congress in Switzerland, to which the United States government sent an official delegate; in 1892 the Department of Labor published the results of an enquiry by one of its appointees; in 1894 and 1904 consular reports were made available; and in the latter year the subject was discussed before the Academy of Political and Social Science, and subsequently became more and more a question which was examined publicly by sociologists and political observers. The introduction of the British scheme in 1911 next gave fresh impetus to these enquiries. Between 1914 and 1918 the American Association for Labor Legislation conducted an extensive campaign — formulating certain "standards" for health insurance, issuing a "Brief for Health Insurance", and in about twenty states stimulating the introduction of "model" Bills, which included cash sickness benefits for 26 weeks, medical care, and maternity and funeral benefits, to be provided by mutual insurance associations of employees and employers supervised and assisted by the State. Commissions, also, issued official reports, with sharply differing views, in California, Massachusetts, New Jersey, Pennsylvania, Connecticut, Wisconsin, Ohio, Illinois, and New York. Various employers' associations, the medical profession, and the druggists were naturally drawn into the agitation. The idea of a compulsory system on European lines was attacked as being "un-American", and much of the discussion was befogged by the introduction of fallacious arguments based on the wholly different problems of insuring workers against the risks of industrial accident and occupational disease. The agitation gradually subsided as the Bills failed to secure adoption in the various state legislatures, and as the entry of the United States into the European war in 1917 focussed attention upon more immediately pressing matters.

The Committee on the Costs of Medical Care

During the period of readjustment following the peace of 1918 little attention was devoted to health insurance in the United States beyond perusal of the studies and reports of the International Labour Office. The era of profitable business was concerned more with costs than methods, so that scrutiny of medical procedures in those years of rising prices became centred in 1927 in an extensive program of research by the Committee on the Costs of Medical Care, with a personnel of 50 prominent representatives of the medical profession, the public health bodies, institutions and special interests, the social sciences, and the public, under the chairmanship of the Secretary of the Interior. During its five years of investigation this Committee issued 26 "Reports" and 15 "Miscellaneous Contributions" on such important questions as the extent of illness, medical facilities, and hospital and nursing services in various localities, the costs of medicines and of medical and dental care, the operations of group medical services, university health services, and private group clinics, the incomes of physicians, the fundamentals of good medical care, and the ability of the individual to pay for it. Collaborating agencies such as the American Medical Association, the American Dental Association, the Metropolitan Life Insurance Company, the National Bureau of Economic Research, the Milbank Memorial Fund, and the Julius Rosenwald Fund also published a number of supplementary reports on the purchase of medical care through fixed periodic payments, the problems of hospital finance, the relations between the private and official practice of medicine, and

many other questions. The Final Report of the Committee, entitled "Medical Care for the American People", which appeared in 1932, gave a summary of the position of medical care in the United States, the essentials of a satisfactory medical program, and the ultimate objective in the organization of medicine, and formulated five major and numerous explanatory recommendations, together with two minority reports and two individual dissenting statements.

The views and conclusions revealed by these extensive documents must evidently be interpreted with care, and with due regard for the social-economic structure of the United States. Many of the reports are of great interest and value as fact-finding researches; some of the interpretations will be generally accepted, in Canada as well as in the United States; others have been disputed even in the latter country; perhaps many may be held to be inapplicable under Canadian conditions. The volumes naturally reflect, moreover, the divergent sociological approaches of the many different authors, and must accordingly be read with an understanding of the atmospheres in which they were produced. Subject to these reservations, therefore, it will be of interest to examine the opinions which were expressed on the problem of group payment.

THE MAJORITY REPORT OF THE COMMITTEE

The following general statement is made, as Recommendation No. 3, in the Majority Report: "The Committee recommends that the costs of medical care be placed on a group payment basis, through the use of insurance, through the use of taxation, or through the use of both these methods. This is not meant to preclude the continuation of medical service provided on an individual fee basis for those who prefer the present method. Cash benefits, *i.e.*, compensation for wage loss due to illness, if and when provided, should be separate and distinct from medical services".

In explanation of this view the Committee added nine supplementary proposals, which may be condensed thus: (*a*) That "industrial, fraternal, educational, or other reasonably cohesive groups" arrange with "organized groups of medical practitioners working as private group clinics, hospital medical staffs, or community medical centres" to furnish them and their families a virtually complete medical service on a voluntary basis; (*b*) that compulsory health insurance should be contemplated, at least in the industrial states, for "all persons" in certain income groups, occupations, or areas (this suggestion, however, being supported altogether by only 11 of the 48 members who composed the whole Committee at the close of its work—and only 5 of the 27 doctors on the Committee were included in these 11); (*c*) that under voluntary health insurance as in (*a*), taxation should be used to supplement the contributions of the low-income families unable to pay the full cost themselves; (*d*) that rural or depressed areas should subsidize physicians or pay them salaries to furnish general medical services, and that, where economic conditions permit, hospital service, public health nursing, dentistry, pharmacy, and visits of specialists might be "provided on the same financial basis and in co-ordination with the physicians' work"; (*e*) that State financial aid should be given to communities where local taxation cannot adequately supplement the voluntary contributions, and that the Federal government should add its support if necessary —on the principle that "it is wise never to rely on a larger unit when the cost can be borne by a smaller one"; (*f*) that, in the absence of a more comprehensive plan, voluntary hospital insurance should be developed, covering professional fees for hospitalized illness as well as the hospital's charges; (*g*) that local taxation should provide for the construction of new, or the extension of existing, hospitals; (*h*) that sound public policy demands that medical, dental, and nursing care for the indigent and necessitous be financed mainly by public funds, with proper remuneration to the practitioners and agencies providing such services; and (*i*) that local and state taxation, to the extent that the resources of the patients are inadequate, should ensure medical services and hospitalization for those suffering from tuberculosis, mental disease, venereal disease, arthritis, and other chronic conditions.

Commenting on the reasons for these suggestions, the report observes that "voluntary co-operative health insurance, as visualized by the Committee, requires the development of a community medical centre, or some less comprehensive form of group practice—a State medical society might initiate and standardize the organization of group practice in local areas, and serve as a negotiating or mediating body in making the arrangements for group payment", so that there might be "financial control by representatives of the public and professional control by participating practitioners". It is emphasized that there are "weighty administrative considerations against making health insurance compulsory as a general program for the United States", although the eleven members who advocate compulsory insurance "believe that such health insurance will eventually be necessary, and that it is unnecessary and perhaps even undesirable to encourage a voluntary system".

THE MINORITY REPORTS OF THE COMMITTEE

In Minority Report No. 1, which was signed by eight physicians and one layman, and afterwards received the approval of the American Medical Association, strong objection was voiced to the idea of group practice through medical centres—mainly on the ground that "the medical centre plan is the adoption by medicine of the technique of big business, that is, mass pro-

duction", and that "the profession of medicine is a personal service, and cannot adopt mass production methods without changing its character". The signatories added that "we look upon this plan as far-fetched and visionary . . .; it seems to us an illustration of what is almost an obsession with many people, namely, that 'organization' can cure most, if not all, human ills". One of the signers stated further that his major objection was against group practice and not against group payment. He suggested that in non-urban communities, where group clinics and hospitals may not be available, "every family be urged to select a family physician to whom shall be submitted all health problems as well as illness problems", and that close co-operation be established between this physician and available laboratories, specialists, etc.—for such an arrangement, in his view, "would preserve the essential personal relationship between physician and patient, and restore the private general practitioner to his rightful place as the key-man in any effective system of rendering medical service". This Minority Report No. 1 also took issue with the Committee's endorsation of voluntary health insurance, on the ground that the numerous plans of that type in the United States "are giving rise to all the evils inherent in contract practice—solicitation of patients, destructive competition between professional groups, inferior medical service, loss of personal relationship of patient and physician, and demoralization of the professions". Compulsory insurance, moreover, was criticized almost as sharply by 7 of the 9 members of this minority. Their view was that it would result in "a vast amount of competitive effort on the part of practitioner groups, hospitals, and lay-controlled organizations, [which] tends to lower the standards of medical care, degrade the medical personnel, and make medical care a business rather than a profession". It was noted forcibly that "compulsory insurance will necessarily be subject to political control, and that such control will inevitably destroy professional morale and ideals in medicine".

Having thus disposed of group practice, contract practice, and voluntary and compulsory health insurance, this minority went on to propose a series of recommendations which they preferred as involving only progressive changes in the present system, instead of those "new methods, based largely on theory, and revolutionary in their practical application", which had been suggested by the majority of the Committee. The essence of their recommendations may be stated thus: (1) That government activity in the practice of medicine be restricted to the care of indigents and those who can be cared for only in governmental institutions, to the Army, Navy, and government services, and to the promotion of public health; (2) that united attempts be made to restore the general practitioner to the central place in medical practice; (3) that chronic diseases needing continuous supervision be treated for an inclusive fee (assessed on a sliding scale based on the patient's circumstances) to cover complete medical service for that disease for a definite period; (4) that County Medical Societies, under the supervision of the state and national societies, should be the unit of organization in any system of group payment (insurance or otherwise); and (5) that under any plan by which payments would be made from a common fund, the patient should always pay directly a minimum amount, based on his means. The kernel of this minority proposal is the establishment of County Medical Societies as the primary and responsible bodies, including and controlling all the physicians of each community, through whom the fee schedules and any plans of group payment or insurance would be operated, and subject to the requirement of a minimum payment by every patient with means. The suggestion may therefore be identified as the "County Society Plan".

Minority Report No. 2 was signed by two dentists, who agreed with Minority Report No. 3 in recommending the county society plan, and in criticizing the majority's community medical centre scheme.

Of the two individual dissenting statements, one (not by a physician) supported compulsory health insurance for everybody, with a sliding scale of contributions according to the person's income; the other (again not by a physician) has explained elsewhere that in his view statewide compulsory health insurance, covering all employees and dependents below a certain income limit, and providing all essential services, should form a part of any system.

THE PRINCIPLES STATED BY THE AMERICAN MEDICAL ASSOCIATION, THE AMERICAN COLLEGE OF SURGEONS, THE AMERICAN DENTAL ASSOCIATION, AND THE AMERICAN HOSPITAL ASSOCIATION

In 1934 and 1935 the American Medical Association, through its House of Delegates, adopted ten principles with respect to health insurance, which called for control and responsibility by the medical profession, no third party between patient and physician, freedom of choice of physician, permanent confidential relations between the patient and a "family physician", payment of cost by the patient in accordance with his income status and in a mutually satisfactory manner, separation of medical services and cash benefits, inclusion of all qualified physicians who wish to give services, and limitation of relief systems below the "comfort level" standard of incomes. On numerous other occasions, moreover, the officers of the American Medical Association have opposed any form of compulsory health insurance which is not controlled entirely by the medical profession.

Further elucidation of the Association's views has been made recently by the publication of a

"platform" which the Association believes should guide development in these matters (see *J. Am. M. Ass.*, 1939, **113**: 1966, and *Canad. M. Ass. J.*, 1940, **42**: 79). While this platform advocates the establishment of a single federal agency for the co-ordination of all the medical and health functions of the Federal Government (exclusive of those of the Army and Navy), which also should have the responsibility of allotting funds to any state in actual need for the prevention of disease, the promotion of health, and the care of the sick, it is urged that local communities in every case should do their utmost to meet such needs before calling for federal funds, and that local determination of needs and local control of administration should form the basis of any method of extending preventive medical services and medical care for the indigent. Emphasis is laid on the desirability of utilizing fully the existing medical and hospital facilities before embarking on vast programs of expansion. The platform then observes that "the medical profession has approved prepayment plans to cover the costs of hospitalization, and also prepayment plans on a cash indemnity basis for meeting the costs of medical care". It states, however, that "it has not been established by any available evidence that a change in the system of medical practice which would substitute salaried government doctors for the private practitioner, or which would make the private practitioner subject to the control of public officials, would in any way lower sickness and death rates", and adds that "careful study of the history of the development of medical care in various nations of the world leads to the inevitable conclusion that the introduction of methods such as compulsory sickness insurance, state medicine, and similar techniques results in a trend toward communism or totalitarianism and away from democracy as the established form of government". This view is supported by the following explanatory statement: "The intensification of dependence of the individual on the state for the provision of the necessities of life tends to make the individual more and more the creature of the state rather than to make the state the servant of the citizen. Great leaders of American thought have repeatedly emphasized the fact that liberty is too great a price to pay for security. George Washington said 'He who seeks security through surrender of liberty loses both'. Benjamin Franklin said 'They that can give up essential liberty to obtain a little temporary safety deserve neither liberty nor safety'. In these times . . . the people may well consider whether some of the plans and programs that have been offered for changing the nature of medical service are not in effect the first step toward an abandonment of the self-reliance, free-will and personal responsibility that must be the basis of a democratic system of government".

The principles approved by the Board of Regents of the American College of Surgeons in 1934 included statements to the effect that physicians caring for the indigent sick should be remunerated from community funds, and that periodic prepayment plans for hospitalization and medical service (with due regard for differing local conditions, and free from the intervention of commercial intermediary organizations operating for profit) offer a reasonable expectation of providing more effective services so long as they are controlled by the medical profession.

The views of the American Dental Association were also expressed in 1934 and 1935, with a resolution that authorized dental representatives should participate in all conferences, a reiteration of the statement of the Board of Trustees "opposing the socializing of the dental profession and all plans of compulsory health insurance", and a resolution favouring further study and experimentation with plans under the full control of the organized health professions.

The American Hospital Association, in 1933 and 1934, endorsed the principle of periodic payments for the purchase of hospital care, suggested safeguards and a basis for such plans, and emphasized the importance of maintaining professional standards.

These official pronouncements, of course, must be read in conjunction with the developments which have been actually occurring during the last few years. The opposition of the American Medical Association to "compulsory health insurance", for example, is unquestionably due, at least to some extent, to a deep conviction, and a very real fear, that in the "New Deal" era the facts and merits of the case have been subordinated to the wishful thinking and propaganda of reforming laymen and the politicians. The pseudo-political nature of the "drive to establish health insurance"—accompanied often by misuse of statistical data, and with little regard for actuarial or insurance principles—has led again to bitter controversies, culminating in the indictment by the Department of Justice, under the Sherman Anti-Trust Act, of the American Medical Association, three local medical societies, and prominent physicians, in connection with the disciplining by the medical bodies of certain physicians who had been providing services under a medical co-operative organization in the District of Columbia. In this litigation the District Court first upheld a demurrer in which the American Medical Association pleaded that the practice of medicine is a "learned profession" rather than a "trade", and that the Sherman Act is therefore inapplicable. The United States Court of Appeals, however, reversed this decision on March 4, 1940. It consequently appears that the issue must now go to trial, unless the Supreme Court —which last year had declined to do so—agrees to review the case.

RECENT DEVELOPMENTS IN MEDICAL SERVICE AND GROUP HOSPITALIZATION PLANS IN THE UNITED STATES

The widespread attention which has thus been given in the United States to the problems of medical economics since the appointment of the Committee on the Costs of Medical Care in 1927 has resulted also in the formation of a large number of voluntary periodic payment plans for the purchase of medical and/or hospital care, of which many follow an insurance basis. The state and county medical societies, the hospitals, some co-operative associations, and a few corporations have all been prominent in the evolution of these methods. In some instances the membership is quite large; the number of schemes and the individuals which they cover are growing steadily—even though there is as yet little indication that they will embrace more than a small percentage of the population. While there is here no space to attempt even a summary of the characteristics of these many plans, it may be noted that the position in 1932 was reviewed on pp. 95-101 of the author's "The Real Meaning of Social Insurance", that the status and procedures under hospitalization insurance were examined carefully in a valuable report on "Group Hospitalization" prepared in 1935 by the Committee on Group Hospitalization of the Canadian Medical Association, and that the trends of the last few years are well summarized in the statement from Dr. R. G. Leland, Director of the Bureau of Medical Economics of the American Medical Association, on pp. 58-59 of the Report of the Committee on Economics to the 1939 Annual Meeting of the Canadian Medical Association. Consideration will be given in a later article of this series to the statistics and cost figures which are being revealed by these valuable experiences—for there can be no question that the results of these voluntary co-operative plans in the United States (after proper allowances, of course, for differing environments) may well indicate the regions within which certain financial estimates in Canada may be expected to lie.

THE COMMITTEE ON ECONOMIC SECURITY, THE INTERDEPARTMENTAL COMMITTEE, AND THE NATIONAL HEALTH BILL

In the midst of these exploratory periodic payment schemes the whole question of the organization of medical services was opened again by the discussions surrounding the Social Security Act of 1935, and the accompanying reports of the Committee on Economic Security. That Committee recognized the importance of safeguarding the ethical position of the medical profession, endorsed the separation of cash benefits and medical treatment, and favoured the establishment of a system of insurance against the costs of medical services which would be compulsory for families with incomes below $3,000 per annum, and would be operated on a state-wide basis under a permissive Federal law. When these suggestions produced no action by the Government, however, various propagandist bodies, such as the American Association for Old Age Security, Inc., and the American Association for Social Security, in particular, entered the discussion with proposals for compulsory insurance—the latter body advocating once more a Bill for enactment by State legislatures, following largely the usual European lines. An "Interdepartmental Committee to Co-ordinate Health and Welfare Activities", which had been appointed by President Roosevelt in 1935, also convened a "National Health Conference" at Washington, D.C., in July, 1938, and made extensive recommendations for Federal aid to state-supported plans of compulsory group payment for medical services, and insurance against loss of wages during sickness. This "National Health Program", as it has been named, was transmitted to the President and then to Congress, and a "National Health Bill" in fulfillment of its proposals has been introduced by Senator Wagner and has for some time been under examination by a Committee.

THE INTERPRETATION OF THE FOREGOING

From all these multifarious discussions it is possible to extract weighty statements in support of almost any conceivable gradation of action or inaction that a particular viewpoint may desire. The opinions are often so diametrically opposed, and rest so frequently on supposition or personal desire rather than on proven facts, that the greatest caution must be exercised in the statement of any broad conclusions. Perhaps the one clear feature is the very small extent to which any sort of agreement has been reached. The position, of course, is wholly different from that of Britain and the European countries—for in the United States, as in Canada, discussion centres upon what might or should be done, whereas in countries where governmental schemes are operating there can be nothing but acceptance of a *fait accompli,* tempered by such criticism as may be deemed permissible or wise in public comment on a national endeavour. It is, however, both easier and sounder to dissect the implications of these far-reaching plans before they are imposed by governmental action from above, than it is to acquiesce quietly in their passage and wish later that something better had been done. For this reason, as in many other matters, the present controversies in the United States constitute an exploratory operation of absorbing value for Canada to watch. They have illuminated many factors which, being pertinent to Canadian conditions, will be examined in more detail in the articles which are to follow.

Association Notes

JUNE CONVENTION ARRANGEMENTS NEARING COMPLETION

Much enthusiasm is evident in Toronto these days over the preparations for the joint Convention, June 17th to 21st, of the Canadian Medical Association and the Ontario Medical Association. Throughout the winter the Program Committee, under the Chairmanship of Dr. Duncan Graham, has been building up the scientific program and its task is now practically complete. The program will be a full one.

Friday and Saturday, June 14th and 15th:

Canadian Medical Association Executive Committee.

Monday, the 17th:

Canadian Medical Association General Council all day.

Tuesday, the 18th:

a.m. Canadian Medical Association General Council.

p.m. Ontario Medical Association Council.

Joint Relations Council on Medical Education, Hospitals and Licensure.

Golf Tournament.

evening. Academy dinner to Councils.

Wednesday, the 19th:

a.m. Round-table conferences. General session.

noon. Luncheon.

p.m. Sectional meetings.

Reception, President-elect and Mrs. Graham.

evening. Annual meeting. Annual dance.

Thursday, the 20th:

a.m. Round-table conferences. General session.

noon. Luncheon.

p.m. Sectional meetings. Canadian Medical Protective Association.

evening. General session on Medical Economics.

Friday, the 21st:

a.m. Round-table conferences. General session.

noon. Special luncheon. Round-table discussion on goitre.

p.m. Sectional meetings.

Delegates will note the sectional meetings being held on Friday afternoon. These will add materially to the length and value of the program.

The Golf Tournament has been changed from Friday afternoon to Tuesday (all day).

The Round-table Conferences, first thing each morning, will be especially featured.

The Royal York is generally considered to be the finest convention hotel in Canada, if not on the continent. Its entire array of meeting halls has been booked for this week.

The Thursday night session devoted to Medical Economics should prove a most timely feature.

The Committee on Lectures has honoured Dr. Alan Brown, of Toronto, in requesting him to deliver the Blackader Lecture this year.

The Scientific Exhibits will again be featured. Already a large number of applications have been received.

WARM WELCOME AWAITS WIVES

Wives who accompany members to the Canadian Medical Association annual meeting in Toronto in June will find themselves in a gay whirl of social activity.

The following tentative program of parties has already been arranged in their honour by the Toronto Ladies Committee, under the general direction of Mrs. Duncan Graham.

Monday, June the 17th:

Tea at the Royal Ontario Museum for wives of members of the Canadian Medical Association General Council. (*Hostess*—Mrs. Alexander Primrose.)

Tuesday, the 18th:

Luncheon at Toronto Golf Club for wives of members of Canadian Medical Association General Council. (*Hostess*—Mrs. Duncan Graham.)

Buffet Supper at Academy of Medicine for wives of members of General Council of Canadian Medical Medical Association and of Ontario Division. (*Hostesses*—wives of members of Academy of Medicine.)

Wednesday, the 19th:

Reception at Hart House for all members and wives — President-elect and Mrs. Graham. Ceremonial and Installation of President; Reception and Dance.

Thursday, the 20th:

Luncheon at Toronto Hunt Club. Tickets $1.00. Private dinners for out-of-town ladies. Toronto Summer Symphony Promenade Concert.

Friday, the 21st:

Left open for private engagements.

Hospital Service Department Notes

The Internship

When the medical course was largely didactic it could not provide practical experience and responsibility sufficient to equip the student to begin the independent practice of medicine. The internship was developed to meet that need, although it is frequently now used as a convenient means of securing a house staff. Twenty-one states require an internship for licensure and thirteen medical schools have a similar requirement for graduation. In almost all instances, however, no educational supervision is provided. Opinion is now rapidly developing that the intern period should become a part of the basic preparation for medical practice and that supervision and direction of the hospital training should be a joint responsibility of the medical schools and those hospitals which provide or can arrange a satisfactory educational experience.

It is well known that there are wide variations in the quality of training offered in hospitals approved for internships, and that many of the accepted services do not meet educational standards. Probably the internship is the most defective segment of medical education at present, and it will have to be corrected in many hospitals before it can reach a real educational level, and before any satisfactory program of graduate training can be instituted.

The answer to this vital phase of medical education is a co-operative program of the medical schools, state licensing boards and those hospitals which can provide an adequate educational experience in the internship. This will require an intimate co-operation of hospitals and medical schools in each region, with united action on such matters as intern selection and instruction and the co-ordination of the hospital period with the clinical clerkships of the medical course.

The integration of the medical school and hospital phases of the basic preparation can be carried out if the medical schools of each of the natural geographic sections of the country are grouped into regional committees to evaluate the internships of their respective areas on the basis of actual firsthand study and knowledge of the hospitals of the neighbourhood. While this is a considerable task and will require time and wisdom to accomplish it is necessary if the internship is fully to serve its function. The suggestion also has the merit of requiring the officers of the schools to become more familiar with the educational opportunities and to help in the programs of nearby hospitals. Hospitals of each area that are found to be satisfactory should be listed in the central office of the Association. Such a list would be available to every medical school and to other interested groups. Many details and difficulties suggest themselves but most of them are not serious. A close educational co-operation between the medical schools and leading hospitals of each section would greatly benefit the hospitals and enormously strengthen the medical program of the entire country. Such a plan should result in significant changes in school as well as in hospital procedures, and should be kept flexible to meet variations in the facilities and instructional personnel of individual hospitals and the needs of different students. The emphasis should be on standards rather than standardization.

As a part of this undertaking, the state boards of medical examiners should be requested to require an internship under educational supervision as a prerequisite for admission to the licensing examination, such an requirement to become effective at a date in the future mutually agreed on by the schools and boards.—From "The Challenge to Medical Education", by Willard C. Rappleye, President, Association of American Medical Colleges, and Dean, Columbia University College of Physicians and Surgeons.

All communications intended for the Department of Hospital Service of the Canadian Medical Association should be addressed to Dr. Harvey Agnew, 184 College Street, Toronto.

The Calgary General Hospital to Employ House Physicians

The Board of Trustees of the Calgary General Hospital has adopted the report of a special committee recommending the employment of three house physicians in that institution. The Calgary General Hospital has not regularly employed interns in the past, but the medical staff is definitely of the opinion that it is in the interest of the patient, the hospital, and the doctor that interns should be employed. In view of the fact that it would take some time to organize the facilities necessary for proper intern teaching, the committee has recommended that for the time being the initial step should be the appointment of three house physicians who would already have had one year of internship experience. These three graduates would maintain a twenty-four hour service in the hospital. It is recommended that the house physicians receive a remuneration sufficiently attractive to retain their services for a period of at least two or three years, so that continuity of service from house physicians having experience in this hospital be continuously available. It was recommended that the salary for the first year be at the rate of $75 per month with full maintenance, and for the second year the salary be $100 per month.

The Cancer Campaign

The Canadian Society for the Control of Cancer

The vigorous prosecution of the war has caused a serious drain in certain circles of man power which hitherto has been available in advancing the interests of cancer control in Canada. We find that the medical profession, long a staunch supporter of all matters pertaining to public welfare, has been quick and generous in responding to the call of democracy. While this spirit is most laudable it had the disconcerting effect of temporarily slowing down the progress of such national projects as the work of the Canadian Society for the Control of Cancer.

As always, those ever willing to carry their full share of the burden have willingly shouldered a greater load, and we are thankful to report that the educational program is once more hitting its stride. Doctors, from Atlantic to Pacific, join in carrying to our great Canadian public the stirring message of hope and courage which is evident in cancer work of today.

Paramount in the success of the Society's progress is the courageous and sustaining leadership of our President, Dr. J. S. McEachern, of Calgary. His indomitable spirit in matters of public welfare is a driving force that urges all those who follow in his footsteps on to greater heights. Of no less importance in the work of the National Society is the sacrifice of men like Drs. T. C. Routley and George S. Young. To these and countless others, scattered throughout the widely separated communities of our far-flung Dominion go the heartfelt thanks of the whole Society. Through them and because of them the great public fear of cancer will be conquered — and having been conquered will pave the way to more encouraging results in the future.

DON. G. MCMASTER.

Notice is hereby given that the Annual Provincial Meeting of the British Columbia Branch of the Canadian Society for the Control of Cancer will be held in the Auditorium, Medical Dental Building, 925 West Georgia Street, Vancouver, British Columbia, on Wednesday, April 3, 1940, at 4.00 p.m. to receive the report of the Board of Directors, the report of the auditors of the Society, to elect two members of the Grand Council of the Society as provided by the Society's By-Laws in that behalf, and to transact such other business as may properly come before the meeting.

By order of the Board,

DON G. MCMASTER,

Secretary.

Medical Societies

The Calgary Medical Society

The annual banquet of this Society was held at the Renfrew Club on Tuesday evening, February 13, 1940. Dr. Morley G. Cody, president of the Society was chairman. The guest-speaker was Mr. David H. Elton, Mayor of Lethbridge, who gave an eloquent address in which he stressed the fact that understanding and goodwill are the need of the world today. What it also needs are more music and less meanness, more harmony and less hate. He remarked that "democracy has not within it the seeds of immortality, it flourishes only as those seeds are cultivated by men and women. In the light of what was happening in Europe, it would be logical to conclude that the lesson of Gethsemane has not yet been learned.

Life-membership in the Calgary Medical Society was presented to Dr. George A. Anderson, who came to Calgary in 1901.

Among the speakers were Lieutenant-Colonel Hazard of the 8th Field Ambulance, Dr. H. H. Hepburn, who represented the Edmonton Academy of Medicine, and Colonel E. R. Selby.

G. E. LEARMONTH

Montreal Physiological Society

The regular meeting of the Physiological Society was held in the Biological Building, McGill University, on February 19th at 8.30 p.m.

The scientific program included the following:

BEHAVIORAL DISTURBANCES IN DEAFENED ANIMALS.—S. Dworkin, Department of Physiology, McGill University.

The speaker described a characteristic neurosis that follows damage to the cochlea in cats previously conditioned to auditory stimuli.

THE EFFECT OF ANTERIOR-PITUITARY PREPARATIONS ON THE TOTAL BODY GLYCOGEN, WATER, NITROGEN AND FAT OF FASTED MICE.—A. H. Neufeld, S. M. Scoggan, G. S. Stewart, Department of Biochemistry, McGill University.

The administration of certain anterior pituitary preparations to normal fasted mice (dba) resulted in a rise of total body glycogen, associated with a low fatty-acid content. The distribution of fatty acids between the liver and the carcass suggests an increased fatty acid oxidation. The water retention observed may be accounted for by the antidiuretic potencies of the extracts. Total body nitrogen and its distribution between the liver and the carcass do not appear to be affected to any appreciable extent. It is suggested that the unusually high glycogen values observed in animals treated with the saline extract of fresh anterior lobes may be associated with the diabetogenic substance.

THE NOSE AND ACCESSORY SINUSES (coloured movie film).—Dr. G. E. Tremble.

O. F. DENSTEDT,
Secretary.

The Ontario Association of Pathologists

On the 19th of December, 1939, the Ontario Association of Pathologists held its first combined scientific and business meeting in Toronto.

The establishment of this Society was the result of a meeting called by the Deputy Minister of Health for Ontario, to consider the matter of approval of Pathologists for work in association with that department. A committee was selected, with Dr. George Shanks as convener and Dr. W. Magner and Dr. G. Lyman Duff as members, to arrange for the formation of an Ontario Association of Pathologists.

Pathologists of the province were asked to attend a meeting in Toronto on the 20th of December, 1938. On this occasion 24 pathologists were present. The organization and constitution proposed by the committee were approved. Dr. G. Shanks was elected president, and a council consisting of Professor James Miller, of Queen's University, Professor W. L. Robinson, of Toronto, Dr. W. Magner, of Toronto, Dr. W. J. Deadman, of Hamilton, Dr. F. W. Luney, of London, and Dr. H. A. Ansley, of Toronto, was appointed. As a result of excellent co-operation from all members the first scientific session took place at the Banting Institute on the date first mentioned above.

The following is a list of the communications presented,—

I. "Classification of Malignant Tumours of Epidermal Origin", by Prof. James Miller, Queen's University, Kingston, and Dr. J. F. McManus, Dept. of Pathology, Johns Hopkins University, Baltimore.

II. Case reports:—

1. "Duct Hyperplasia of Breast with Early Carcinoma", by Dr. H. G. Pritzker, Mount Sinai Hospital, Toronto.

2. "Fatal Intra-pulmonary and Mediastinal Emphysema following Foreign Body Aspiration into the Bronchus", by Professor J. H. Fisher, University of Western Ontario.

3. "Congenital Syphilis with Multiple Cardiac Gummata and Pneumonia Alba", by Dr. W. D. Hay, Queen's University, Kingston.

4. "Chorionepithelioma in a Male Patient", by Dr. W. J. Deadman, Hamilton General Hospital.

5. "Intra-dural Tumour of Spinal Cord", by Professor E. Linell, University of Toronto.

The business session followed a luncheon at the Royal York Hotel. Constitution and By-laws were approved and 38 original members formally listed. Officers and council for the ensuing year were appointed. They are as follows:—

President—Professor James Miller; *Secretary*—Dr. H. A. Ansley; *Council*—Drs. W. J. Deadman, J. W. Luney, W. Magner, Prof. W. L. Robinson, and G. Shanks.

It was decided to hold the next scientific meeting at Kingston in September, 1940.

The Regina and District Medical Society

The regular monthly meeting of the Regina and District Medical Society was held on February 21st. The guest speaker of the evening was Mr. P. G. Hodges, K.C., who quoted peculiar English laws of special interest to the medical profession.

The Society at this meeting entertained the medical men who are attached to the Militia. Dr. W. A. Dakin proposed their health and Lt.-Col. W. Coke replied.

Dr. J. B. Ritchie, who has just returned from a tour in South America, described his visit to the light cruiser *Ajax* and to the large cancer clinic in Buenos Aires. LILLIAN A. CHASE

The Royal College of Physicians and Surgeons of Canada

The Tenth Annual Meeting of the Royal College of Physicians and Surgeons of Canada was held in the Auditorium of the National Research Council Building, Ottawa, on October 28, 1939. Some 110 Fellows registered.

For the Scientific Session an interesting program had been arranged, and consisted of a symposium on "Sulfanilamide and Allied Compounds". The contributors were: E. H. Bensley, Montreal; Emile Gaumond, Quebec; P. H. Greey, Toronto; D. R. Mitchell, Toronto, and D. A. Graham, Toronto.

A report of the activities of the Council during the year was presented by the President.

During the past session of the Federal Parliament amendments to the Charter of the College were secured authorizing the setting up of standards, the conducting of examinations, certification and registration of those competent in special fields of Medicine. A further Charter amendment establishes the certificate of the Medical Council of Canada as an alternative qualification to license to practise in one of the Provinces of Canada, for admission to the Final Examination leading to Fellowship.

Examinations 1939:—A special Primary Examination had been held in June, at Montreal, with seventeen candidates, of these nine in all were successful:—

Dr. Vincent P. Collins, Dr. Edmond J. Delorme, Dr. George A. Holland, Dr. F. M. Woolhouse, Donald L. Lloyd-Smith, Arne K. Matheson, W. H. T. Reason, C. P. Rance, Norman B. D. Taylor.

The regular autumn examinations began on October 2nd and ended on October 25th.

Of the forty-five candidates for the Primary Examinations twenty-three were successful and received the certificate:—

Dr. Jean B. Baillargeon, Dr. W. Elgin Crysler, Dr. Max E. Geissinger, Dr. Cecil G. McEachern, Philippe Albert, David M. Bean, Joseph Bergeron, Roger Beaulieu, Léon Beique, Jean Bourque, Malcolm C. Cameron, Robert Caouette, Maurice Demay, Charles H. Dorval, Alan S. Douglas, Robert F. Ferguson, Edouard D. A. Gagnon, Jacques Genest, Hugh C. Keenan, Louis R. Létienne, Leo Paul McMahon, Joslyn W. Rogers, John W. Whiteside.

There were in all 34 candidates for the Final Examinations, both Divisions, eighteen were successful:—

Medicine: Dr. Leyland J. Adams, Montreal; Dr. Louis J. Breslin, Toronto; Dr. Gordon A. Copping, Westmount; Dr. Clyde W. Holland, Halifax; Dr. R. Vance Ward, Montreal.

Surgery: Dr. Walter S. Anderson, Toronto; Dr. George S. Barber, Brantford; Dr. M. Guy d'Argencourt, Drummondville; Dr. George W. Danton, Endicott, N.Y.; Dr. Harry R. Elliott, Toronto; Dr. Charles H. Greig, Toronto; Dr. Fraser M. Greig, Bracebridge; Dr. Freeman R. Guest, Walkerville; Dr. Fraser B. Hamilton, Hamilton; Dr. George A. Holland, Montreal; Dr. David W. B. Johnston, London; Dr. C. Russell Salsbury, Kingston; Dr. Thomas M. Steele, Weston.

Calendar for 1940: Annual Meeting, Saturday, October 26th.

Written Examinations: Monday, September 30th; Tuesday, October 1st; Wednesday, October 2nd.

Oral and Clinical Examinations: Edmonton, Monday, October 21st; Montreal, Thursday, October 24th, Friday, October 25th.

To meet the exigencies of the present war and the possibility of military duties on the part of members of the medical profession the By-law which makes provision for a Special Final Examination for candidates who are graduates of 1930 or prior thereto, has been amended so as to extend its privileges beyond 1940 and until such time as Council may later decide.

Ad Eundem Fellowships were granted as follows:—Frederick Gordon Kergin, M.D., B.A., F.R.C.S. (Eng.), Toronto; Campbell McGregor Gardner, M.D., C.M., F.R.C.S. (Eng.), Montreal; Simeon Jameson Martin, M.D., C.M., F.R.C.S. (Edin.), Montreal; James Arnold Noble, M.B., Ch.B., F.R.C.S. (Edin.), Halifax; Frank Burns Plewes, M.A., M.D., F.R.C.S. (Edin.), Toronto; James William Reid, M.D., C.M., M.R.C.P. (Lond.), Halifax.

Honorary Fellowships were granted to The Honourable James H. King, P.C. (Canadian), M.D., C.M., LL.D., F.A.C.S.; Minister of Public Works for Canada 1922; Minister of Pensions and National Health for Canada 1926-30; Member of Canadian Senate since 1930, Ottawa.

Major-General Andrew G. L. McNaughton C.B., C.M.G., D.S.O., LL.D.; Chief of Canadian General Staff 1925-35; President of the National Research Council of Canada 1935-39; Commanding 1st Division Canadian Overseas Force 1939, Ottawa.

Officers elected to serve from 1939-41 are as follows:—

President—Dr. Wilder G. Penfield, Montreal; *Vice-president,* Division of Medicine—Dr. Albert LeSage, Montreal; *Vice-president,* Division of Surgery—Dr. John A. Gunn, Winnipeg.

The Annual Dinner was held at the Chateau Laurier, Dr. Robert C. Wallace, Principal and Vice-Chancellor of Queen's University, Kingston, was the guest of the College and addressed the Fellows after the dinner.

University Notes

University of Manitoba

A Post-graduate Course in Recent Advances in Therapeutics was given by the Faculty of Medicine, University of Manitoba, at the Medical College on February 21st, 22nd, 23rd. The discussions were led by Drs. J. M. McEachern, H. D. Kitchen, L. G. Bell, J. D. Adamson, A. Hollenberg, D. C. Aikenhead, A. T. Mathers, Brian Best, W. F. Abbott, K. J. Backman, H. Morse, C. W. Burns, John A. Hillsman, G. S. Fahrni, M. R. MacCharles, W. A. McElmoyle, Dougald McIntyre, Ellen Taylor, Ton Quong, Fred Cadham, C. R. Donovan, D. S. Boulton, W. J. Wood, Harry Medovy, J. D. McQueen, Elinor Black, Ross Mitchell, F. G. McGuinness, Frank White, W. M. Musgrove, C. R. Rice, Ormerod, Gilbert Adamson, A. M. Davidson. The subjects discussed were: Treatment of congestive heart failure; treatment of pneumonia; treatment of anæmias; treatment of acute hæmorrhage from peptic ulcer; the use of protamine zinc insulin in diabetes; practical demonstration of spinal anæsthesia and the use of the newer anæsthetics; insomnia; leukorrhœa; investigation of sterility; sulfanilamide in the treatment of genito-urinary infections; gastro-intestinal intubation for the relief of post-operative distension and small bowel obstruction; rationale of post-operative fluids; common post-operative complications and their treatment; pre-operative preparation of the serious surgical risk; injection treatments; diagnosis and treatment of diphtheria, scarlet fever, typhoid fever; prevention and control of diphtheria, scarlet fever, typhoid fever, whooping cough, some general considerations of immunology; treatment of abortion; treatment of toxæmias of pregnancy; treatment of occiput posterior; present status of

vitamin therapy; treatment of epilepsy; treatment of urinary frequency in females; use of mercurial diuretics; treatment of menopausal neurosis; use of vaccines and serums; treatment of common skin diseases. ROSS MITCHELL

Letters, Notes and Queries

Constipation in Infancy

To the Editor:

Will you please suggest a laxative to be used when required in infants from the age of birth up, during the first year? I always deprecate the use of castoria, but it certainly has a nice taste and appeals to the mother. I prescribe milk of magnesia and an occasional dose of castor oil in marked constipation. Leaving out the assistance of the sugars, orange juice, prune juice, cod liver oil, etc., what would you recommend?

P. J. CARROLL, M.D.

Claresholm, Alta.
January 19, 1940.

Whenever possible, it is best to treat constipation in infancy by alterations in the diet rather than with medicines. If an infant is otherwise quite comfortable and passes a spontaneous soft stool every two days or so it is best to do nothing, for the apparent constipation may be only an expression of a more complete absorption of food. Hard, putty-coloured, formed stools in infants are usually due to an excessive amount of rich milk. Here the condition can be readily adjusted by partial skimming of the milk and by reduction of the total daily quantity if it has been given in amounts greater than two ounces per pound of body weight per day. The sugars, too, are important in this connection. Quite often a change of sugar, such as from lactose to corn syrup or from corn syrup to honey may be effective, or the total quantity of sugar may be increased to a maximum of two ounces per day. Various cereals have more or less laxative actions—oatmeal gruel, whole wheat cereal, etc. Despite the correspondent's request, these measures cannot be omitted from any discussion of constipation in infants. Suppositories tend to aggravate the habit of constipation, but may be used occasionally if the procedure is not practised too regularly. Bland remedies only should be used. Mineral oils, with or without agar-agar, are sometimes of benefit, but simplest of all is a teaspoonful of milk of magnesia added to the first morning bottle. The effectiveness of milk of magnesia is almost entirely lost if it is given in divided doses or mixed with the entire formula. The risk in readily prescribing simple laxatives in cases of constipation in infants is that the physician may fail to see or to search for the fundamental causes which, if discovered and corrected, will obviate the necessity of administering medicines.

Robertson* has recently called attention to the relationship between intestinal stasis and low mineral intake. She has suggested the administration of calcium lactate and potassium chloride to the diets of those children where mineral deficiency may be a factor.

ALTON GOLDBLOOM.

Montreal,
February 13, 1940.

Answers to letters appearing in this column should be sent to the Editor, 3640 University Street, Montreal.

The Use of Apple Juice

To the Editor:

The war has dislocated the distribution of our apple crop. Science has given us tinned apple juice. We need our U.S. funds to buy planes, etc.

May I suggest that our national medical journal begin a campaign to substitute in the medical mind—"apple juice" for "orange juice".

It would seem that apple juice is a potent source of vitamin C. Its content of pectin should make it, and does, a welcome drink for those with gastric hyperacidity. May I add that it mixes well with various bottled beverages popular throughout the country. Just try it!

PATRIOTIC COCKTAIL

Canadian gin — 6 oz.
Apple juice — 3 oz.
Canadian vermouth — 1 oz.
Bitters — 8 drops
Plenty of ice, and a good shake.

Nectar!!

Sincerely,

E. H. WOOD, M.B., F.A.C.S.

Ottawa, Ont.,
February 23, 1940.

Topics of Current Interest

War-time Prescribing

Practitioners or committees who have studied their bills for drugs during the last couple of months will have realized that the cost of medication has risen steeply. Some of the increases, as in ephedrine and ergot, are the result of a world shortage and the aftermath of the wars in China, Spain, and Poland. In other cases there is competition between armaments and foods and drugs for the same raw materials or the same shipping space. Drugs which were formerly imported cheaply must now be manufactured at home more dearly to save precious

* *Am. J. Dis. Child.*, 1937, **53**: 500.

currency. When Æsculapius is deserted for Mars and the shadow of autarky falls on the garden of physic the prudent physician must learn to husband his resources. Dr. George Dock needed no more than twenty drugs, but things have changed since he wrote his advice to house officers, and the advance of knowledge and the wiles of advertisement have combined to increase the variety and cost of therapeutic agents. In war there is no room for internecine strife, so we may ask our chemical manufacturers whether it is necessary for each of them to coin a different name for a single substance such as stilbœstrol or mandelic acid; whether it is necessary for each of them to market a different local anæsthetic, barbiturate, and analeptic; and whether in matters of nomenclature and advertisement they might not be wiser to copy American rather than German methods?

The first economy is not to use drugs unless they are necessary. Advertisements for purgatives bulk very large in our post-box and the Press, yet experts continue to warn us that purgatives are usually not only unnecessary but actually harmful. Most of the drugging of the common cold and the simple fevers is equally ill advised. It is a pity that medical students are not expected to know the cost of drugs as well as their doses, or to study books such as the *National Formulary,* in which useful lists of equivalents and alternatives are given. For want of this basic training physicians and surgeons are often unaware of the discrepancy in prices between preparations under official and proprietary names. This is particularly true of hypnotics, local anæsthetics, and the numerous analgesic tablets. Every time a new barbiturate is introduced the physician should remind himself that chloral hydrate and paraldehyde remain the cheapest and best-tried hypnotics.

Alkaloidal salts which may be difficult to obtain—such as ephedrine, atropine, hyoscine, and ergometrine—should only be prescribed when absolutely necessary. Codeine salts are expensive; aspirin and phenacetin are comparatively cheap. Calcium carbonate, magnesium carbonate, and kaolin can often successfully replace bismuth carbonate in compound alkaline powders. Stilbœstrol and kindred synthetic œstrogenic substances are much cheaper than the actual female hormone, and should be used whenever possible. Expensive highly specific drugs should not be prescribed for non-specific purposes. There are cheaper bitter tonics than quinine. Again, the drug sulfapyridine is at present irreplaceable in the treatment of pneumonia and gonorrhœa, but the much cheaper simple sulfanilamide is at least as effective in streptococcal infection and pyelitis, and probably in cerebrospinal fever also. No other compounds in this group can show the same proofs of efficacy, and parenteral administration of the expensive soluble derivatives is rarely justified. Vitamins are meant for avitaminosis, and should not be used for conditions which would respond as well to a few chips of quassia. Oral extracts of liver are practically never indicated, and in the treatment of pernicious anæmia liver should be given by intramuscular injection; the same amount of liver will then go a hundred times as far.

Too often, again, money is wasted on expensive excipients or solvents such as syrup or alcohol. The *British Pharmacopœia* (1932) introduced standardized powdered drugs, but the hope that they might be widely prescribed has not been fulfilled. Digitalis pulverata, belladonna pulverata, ergota præparata, ipecacuanha pulverata, and nux vomica pulverata are typical examples. The prescription of these would save alcohol and reduce cost, and as they are available in tablets the smaller bulk would simplify problems of storage and transport. Digitalis and ergot in tablet form are also more stable than any liquid preparations of the drugs. If mixtures are essential the liquid extracts should more often be used instead of the corresponding tinctures—for example, liquid extracts of hyoscyamus, nux vomica, ipecacuanha, senega, etc. The mixtures in the *National Formulary* have all been formulated on this principle. Concentrated medicinal waters, such as concentrated peppermint water and concentrated dill water, and flavouring tinctures like tincture of orange, contain high percentages of alcohol on which no rebate may be obtained and are therefore unduly expensive. The concentrated waters may be replaced by emulsions of the volatile oils in water —for example, emulsio olei menthæ piperitæ (*B.P.C.*). A whole article could be written on unnecessary bulk in the dispensary and the waste of money in transport of diluents and containers. For example, hydrogen peroxide should be transported in the concentrated 100-volume strength and diluted to the pharmacopœial standard in the dispensary. Every hospital with a pharmacist should make its own distilled water and sterile solutions and be prepared to supply them in its area of service instead of importing them in flasks and Winchesters.—*Brit. M. J.*, 1940, **1**: 177.

Medico-Legal

Trottier vs. Rajotte

SUPREME COURT OF CANADA, DECEMBER 22, 1939

A decision of much interest to members of the profession in the Province of Quebec has just been handed down in an appeal to the Supreme Court of Canada. The circumstances are these.

The Plaintiff in September, 1932, went to Montreal, where she was operated on by a senior surgeon at one of the leading hospitals. He performed an operation primarily for the pur-

pose of removing her appendix, but on finding that her left ovary was diseased, he removed it at the same time and through the same incision. Under the practice which he followed no sponge count was taken. The Plaintiff subsequently returned to her home in the country. In March, 1934, she was again under medical treatment and underwent a further operation during the latter part of April, when an obstruction was found in the small intestine. Seven or eight inches of the intestine were removed and the remaining ends joined together. It was contended that the obstruction inside the small intestine was a sponge or compress which had been left in the Plaintiff's body by the Montreal surgeon who had operated on her in September, 1932, and she forthwith brought an action against him for $15,000 damages.

On the trial, defence was made on the merits, and also it was contended as a matter of law that she was a married woman common as to property and that under Quebec law only her husband could sue for the recovery of damages and that she was therefore without any status to bring an action. It was further contended that in any event the action was prescribed by lapse of time.

The action came on for hearing in the Superior Court in the District of Montreal on December 15, 1936, and the trial judge awarded the Plaintiff $3,000 with interest and costs and a reservation of future rights. He dismissed the defence on the two points of law. An appeal was taken to the Court of King's Bench, Appeal Side, which confirmed the trial judge on the merits, removed the reservation as to future rights, and dismissed the appeal on the points of law by a divided judgment, three to two. An appeal was then taken to the Supreme Court of Canada, which in its turn dismissed the appeal on the merits but reserved the two points of law for further consideration.

After most exhaustive consideration the Supreme Court of Canada, by a unanimous judgment handed down by the Chief Justice on the 22nd of December last, allowed the appeal and maintained both contentions of the Defendant.

First: The Court held that the Plaintiff is a married woman common as to property, and, by the law of the Province of Quebec, the right of action for damages for personal injuries belongs exclusively to her husband. Therefore, she could not sue for damages in her own name, even with the authorization of her husband, and her action fails.

Second: The Court held that the prescriptive period was that laid down by Article 2262 (2) of the Civil Code of the Province of Quebec reading as follows: "2262. The following actions are prescribed by one year: 2. For bodily injuries, saving the special provisions contained in Article 1056 and cases regulated by special laws", and, quite apart from any other ground, that this was conclusive to defeat her claim. The decision on this second ground may have very important consequences to the profession in the Province of Quebec. According to the judicial interpretation of Article 2262, prescription runs from the date when the injuries are inflicted, and the action must therefore be brought within one year from the date of the negligent act. It is conceivable that an injury may exist before it is felt by the patient, but there is no provision in the law for this eventuality and, contrasted with the other Provinces of Canada, the period within which a doctor may be effectively attacked may be shortened very considerably as prescription may run from the date of the operation or treatment creating the injury rather than from the date when the professional services are terminated, as is the general rule throughout the rest of the Dominion.

(Signed) E. F. NEWCOMBE, K.C.

From a purely medical point of view this case deals with a matter on which comment is worth while if not absolutely necessary. It illustrates a point the Canadian Medical Protective Association has been making for some years. It is absolutely essential that a sponge count become a routine part of every operative procedure in every operating room of every hospital in the country. Not only is it true that under British law the doctor is held solely responsible for insisting that the count be made but he has the right to insist that if sponge counts be not routine for all operations in the institution they must be routine when he is operating.

From a practical point of view it is comparatively easy, and a matter which takes little or no time, for the surgeon in charge to request a sponge count before an operation begins. Again before closure a request should be made for the sponge count to be balanced, and any delay occasioned by this re-count should not exceed a minute or two. Where sponge counts are not an integral part of the operative procedure of an institution such requests should be made carefully, deliberately, and insistently.

The reason is obvious. If a sponge be left in a patient when a sponge count has not been done, there is absolutely no defence for the surgeon. He has been guilty of gross negligence, and when such a case gets to court the decision is no longer whether the surgeon should be penalized but simply the severity of the penality, which will depend on what damage the court decides has been done.

While as far as the Canadian Medical Protective Association is aware the point has never been decided in court, it is probable that there should be, as well, an instrument count, particularly of small instruments, thumb forceps, hæmostats, etc. The Association suggests that a count of small instruments should become a part of the routine operative procedure in all hospitals.

Abstracts from Current Literature

Surgery

Tuberculous Spondylitis. Walheim, T.: *Acta Chir. Scand.*, 1939, **83**: 123.

The data are from 221 cases, 149 with modified Albee's operation, 72 treated conservatively. Thirty per cent of the cases occurred before 5 years of age, 50 per cent before 10 years. The average number of vertebræ affected was three. Thoracic, 9 to 12, were affected in 30 per cent; lumbar, 1 to 5, in 35 to 42 per cent of cases, the latter figure in the conservatively treated. In the operatively treated gibbus was present in 96 to 81 per cent, abscess in 48 to 36, fistula in 9 to 12 per cent, the latter figures in those over 15 years. In the conservative the presence of abscess and of fistula was one of the deciding criteria for non-operative measures. They recognize two types of paraplegia depending upon the causal factors. In the first year mechanical factors are responsible, chiefly as œdema or intramedullary abscess; in later years the paralysis results from pachymeningitis and as such is recognized by its slow development. Recovery from paralysis has been the rule rather than the exception with proper control of these patients. The complaints on admission were pain, stiffness and tiredness in the back. Measles, pertussis, influenza and pneumonia histories frequently preceded the onset by a few months, and in numerous instances the general sense of well-being had not been regained; in other words, there was a lowering of immuno-biological resistance and multiple foci might well be looked for. About 40 per cent were incorrectly diagnosed prior to admission. About half the deaths occurred from other than tuberculous conditions. The mortality rate in the group not operated on was three times as great as in those operated on. Only 45 per cent of the 221 cases showed spondylitis as the sole lesion of tuberculosis. In the group operated on attempts are first made to reduce the gibbus by local pressure and posture in plaster beds: the bone graft extending only to the affected vertebræ and consisting of os novum (os purum with the inner layer of periosteum of the tibia which may have been increased by cortical bone drilling). An exhaustive follow-up was made. Extensive preoperative care was used (x-rays, sedimentation rate, general condition, etc.). The average hospital stay was 19 months in the cases operated on and 17 months in those not operated on. The average period of treatment before cure was 33 months for those operated on; 57 months for those conservatively treated. In the adults each of these periods was of 4 months' longer duration. Walheim concludes that operation offers more hope of clinico-functional results, although the percentage of cure is not so high.

FRANK DORRANCE

Hyperinsulinism and Surgery. Akerberg, A.: *Acta Chir. Scand.*, 1939, **83**: 104.

Pathologically this state may arise, theoretically, in (1) hyperfunction of an apparently normal pancreas; evidence is lacking to support this hypothetical state. (2) Various endocrine disorders of extra-pancreatic origin; numerous conditions such as glycogenesis (Von Gierke), suprarenal insufficiency, and the activity of the pancreatotropic hormone of the hypophysis, etc. (3) Malignant tumours in the islets of Langerhans and the liver. (4) Islet adenoma of the pancreas. Some other factor is necessary to produce the hypoglycæmic attacks, as it has been found that adenoma may be present without having produced these attacks. It is probable that the rate at which the blood sugar value falls is one important feature. The attacks are probably associated with the falling-phase of blood sugar; they occur usually in the morning when the liver is most active in its glycogen-forming phase. A laboratory test to distinguish pancreatic from extra-pancreatic hypoglycæmic attacks is lacking.

The author's indications for operative measures to the pancreas are the occurrence of unexpected prodromes, or attacks in an otherwise healthy person, without signs of other endocrine dysfunction, especially if these attacks are severe and not controllable by dietary measures. The adenomas are usually 1 to 2 cm. in diameter, have a thin capsule encircled by a thick network of small delicate vessels, blue-red in colour, situated superficially in the body or neck of the pancreas. Resection of the pancreas in subtotal amounts, as in removal of the thyroid for exophthalmic goitre, is not warranted.

FRANK DORRANCE

McClure-Aldrich Test in Water Balance. Christopher, F. and Hopps, H. C.: *Surg., Gyn. & Obst.*, 1939, **69**: 637.

The authors believe it is possible to diagnose dehydration by this test prior to the clinical diagnosis, and also that diagnosis by this method is more exact and allows for beneficial treatment with the minor degrees of dehydration. The test consists of the average of absorption time of intradermal wheals on the volar aspect of the forearm, at the junction of the middle and proximal thirds, and on the upper lateral chest wall of 0.2 c.c. of 0.85 per cent solution of sodium chloride as compared with the absorption time of a patient in normal water balance. In normal time the wheal disappears from 55 minutes upwards; in the dehydrated, according to the rapidity of absorption there are the slightly, moderate, and severely dehydrated from the ranges of 55-50, 50-45 and 45-40.

FRANK DORRANCE

Obstetrics and Gynæcology

Treatment of the Menopause with Œstradiol Dipropionate, Dorr, E. M. and Greene, R. R.: *Am. J. Obst. & Gyn.*, 1939, **38**: 458.

Œstradiol dipropionate, a synthetic product, is the doubly esterified form of œstradiol, presumably the true follicular hormone. In the series reported 55 patients were treated with œstradiol dipropionate. It was found that patients were rendered symptom-free more rapidly by giving large doses (2.0 to 5.0 mg.) for the first few treatments. No patient was treated oftener than once a week. After a patient was free from the hot flushes (usually one to three weeks) an attempt was made to determine her maintenance dosage. The ages of the patients in this series varied from 29 to 59 years, with an average age of 43 years. Twenty-one of the 55 patients had to be treated once a week for maintenance; three, every ten days; twenty-five, every second week, and the remaining six every third or fourth week. The maintenance dose per four weeks in the 55 patients was 2.0 mg. or less in 21; 4.0 to 5.0 mg. in 10; 7.5 to 10 mg. in 15; and 15.0 to 20 mg. in 9.

On the basis of recurrence of subjective symptoms in 10 of 11 menopausal patients and of objective vaginal smear changes in 8 patients, œstradiol dipropionate is clinically more effective per milligram in the human being than is œstrone.

Œstradiol dipropionate has been shown by previous workers to have a very prolonged œstrogenic effect in the experimental animal. Evidence is presented that this compound has a prolonged effect in the human being also. It is of unusual clinical value in that injections may be given at infrequent intervals.

ROSS MITCHELL

A Study of a Case of Hydramnios, Goodall, J. R., Morgan, G. and Power, R. H.: *Am. J. Obst. & Gyn.*, 1939, **38**: 494.

Not all cases of hydramnios are due to infection. We do know that other causes, such as cardiac decompensation with venous stasis, will produce hydramnios, as will also congenital fetal cardiac and renal diseases, but it does seem conclusive that maternal foci of infection can transmit that infection to the amniotic sac, and if early enough may infect the fetal neural system, and may produce infectious changes in other organs. ROSS MITCHELL

Effect of Vitamin E Deficiency on the Rat. Barrie, M. M. O.: *J. Obst. & Gyn. Brit. Emp.*, 1939, **46**: 49.

An extensive study of vitamin E in pregnancy is made, with histological presentation and numerous statistical tables recorded. An account is given of 667 rat gestations in which 38 were accompanied by toxæmia. All the animals used were suffering from some degree of vitamin E deficiency, and 71 per cent of the cases of toxæmia occurred among the animals in which this deficiency was not complete but was sufficiently severe to prevent the birth of a living litter. The pathological findings were fatty infiltration of the liver, deposition of calcium salts in the kidneys, which also showed large amounts of albumin and associated degeneration of the cells of the tubules. P. J. KEARNS

The Treatment of Pyosalpinx. Haultain, W. F. T.: *J. Obst. & Gyn. Brit. Emp.*, 1939, **46**: 503.

The author gives his personal views, and presents 84 personal cases of definite pyosalpinx, 54 acute, 30 chronic. Of the 84 cases 22 were tuberculous in origin; 24 cases were treated conservatively only. Operative treatment is advised in all cases where conservative treatment has failed, or there is continued poor health. Five deaths are recorded among 30 patients operated upon; 3 from rupture or necrosis of the tubal wall; the other two followed conservative and operative treatment. The white blood cells and sedimentation tests were found reliable evidences of severity in the tuberculous class; 22 cases are recorded, 8 acute, 14 chronic. Twenty cases were operated upon, there being a radical operation in 13; one death is recorded. After seven years the study showed that those operated upon were exceptionally well, with little evidence of spread of tuberculosis elsewhere. P. J. KEARNS

Oto-rhino-laryngology

External Operations on the Frontal and Ethmoidal Sinuses. Patterson, N.: *J. Laryngol. & Otol.*, 1939, **54**: 235.

The author discusses the advantages of external operations on the frontal and ethmoidal sinuses as opposed to intranasal surgery. Ogston in 1884 introduced external operations on the frontal sinus in which the sinus was opened by trephining and the fronto-nasal duct was enlarged. These early operations were not satisfactory and soon intranasal operations supplanted them. Due largely to the influence of Walter Howard, external operations have recently again become popular.

The author discusses a technique which minimizes scarring and provides good exposure. This approach is safer than any "attempted" radical intranasal surgery. It is difficult to ascertain even by x-ray as to whether the frontals or ethmoids are mainly affected by disease, and, therefore, both should be considered as affected. Not infrequently the antrum is also involved. Careful pre-operative x-ray study is essential, due to individual anatomical variations. He states that, in order to avoid unsightly scarring, there are only two regions where incisions should

be made, *viz.*, the neighbourhood of the supra-orbital ridge, and in the cheek. In some cases both incisions are employed with a space between them. In no case should the frontal incision extend beyond the eyebrow. Through this incision the fronto-nasal duct can be explored and the anterior ethmoidal cells removed. The extent of frontal sinus operations depends on the anatomical and pathological findings. Except where the frontal sinus is obliterated a tube must be inserted and removed, through the nose, in about one week's time.

His ethmoidal incision begins ¼ inch below the inner canthus, and follows a natural fold downward for about an inch. A stitch is placed in the upper extremity of the incision. The ethmoidal vessels are divided between ligatures. All ethmoidal cells are opened and the mucosa removed. Finally, the sphenoid is explored and the anterior wall removed if necessary. Sometimes the frontal sinus can be explored through the ethmoidal incision.

The author prefers general anæsthesia preceded by cocaine and adrenalin in the nose.

He finds his results most gratifying. He promises the patient a nose permanently free from polypi and states, where chronic suppuration is present, excision of the affected area is the only certain means of eradicating the disease. None of his patients has developed any serious complications. E. A. STUART

Radiology and Physiotherapy

Present Conception of the Treatment of Cancer of the Larynx. Coutard, H.: *Radiology,* 1940, **34**: 136.

We now have a better knowledge of the chronological involution of cancer of the larynx and of the chronological steps necessary for the treatment. For a long time we have been influenced by the fact that the undifferentiated forms disappear with extreme rapidity, whereas the differentiated form requires from three to four months for its disappearance; but the dose which provokes the disappearance of the latter is approximately the same as that which provokes the disappearance of the former. The method of distribution and the time of distribution are the only changes.

The cancericidal intracellular dose is maximal, 4,500 r to 5,000 r, as the cellulicidal dose of the skin. But it is difficult to know the best condition of the repartition of this dose in order to give it in such a way that the effects are maximal. The essential problem is, therefore, distribution of time and physiological repartition.

A cancer with differentiated cells must receive this total intraneoplastic dose under certain special conditions from the point of view of chronological distribution. If we know how the dose must be given at the moment when the cells accept it, tolerate, and assimilate it, obviously the result will be quite different from that which results if this energy reaches the cells at a moment when they are completely indifferent to external influences. Further, one must give these differentiated cells very high daily doses in such a way that the time of irradiation is very short, because the time when the cells are able to utilize the energy brought to them is very short.

In undifferentiated cancers the chronological margin is large, provided a cellulicidal dose is given, and in these cases this dose can be enlarged without inconvenience because of the tolerance of the vasculo-connective tissue.

The duration of treatment is always in inverse proportion to the degree of infiltration and immobilization of the cancer. A cancer of the vocal cord with perfect mobility and not infiltrating can be treated successfully in 40 or 50 days. As the tendency of the cells to unite with the vasculo-connective tissue increases, the chronological margin becomes reduced to a maximum of 30 days. When the infiltration is more marked it becomes reduced to 20 days. A cancer with differentiated cells intimately connected with muscle fibres demands a maximal treatment time of 12 days and sometimes less.

The better results which we have obtained were reached with small intensities of from 2 to 3 r per minute in the region of the neoplasm, and with a total duration of from 25 to 30 hours for 7,000 r on the skin. The modern American machines have an output of 40, 50 and 80 r per minute at 50 cm. focal skin distance, and one is always tempted to reduce the duration of the irradiation and to increase its speed. In this way, from the first days, one produces very marked œdema and rapidly reduces the radiosensitivity of the tumours by brutal modifications of the vasculo-connective tissue.

The use of high voltage, which we have considered ideal for many years, has permitted us to realize certain of our ideas in the treatment of cancer, particularly the simplification of the methods of roentgen therapy. This simplification has been accomplished by the use of a single field with a regular and daily decrease in the surface area and with a regular and daily increase in the dose. The use of this technique considerably increases the precision of treatment and its efficacy, the necessary doses are reduced, and the cancers appear to be more radiosensitive. R. C. BURR

Anæsthesia

An Anæsthetic Technique for Upper Abdominal Surgery. Organe, G.: *Current Researches in Anæs. & Anal.,* 1939, **18**: 339.

Spinal anæsthesia is not entirely satisfactory, in that it does not do away completely with the psychic injury. Many methods have been tried to augment it, such as intravenous nembutal, nitrous oxide and oxygen, etc. Nembutal works fairly well but the patient is often restless during the operation. Nitrous oxide does not always

work well and is bad from the standpoint of the cyanosis often present. Probably spinal anæsthesia therefore is best reserved for those cases where it is definitely indicated. One of these is upper abdominal operations in fit subjects where the alternative is deep anæsthesia with nitrous oxide and ether and its attendant toxic and irritant effects.

Technique.—The patient is given pantopon, gr. 1/3, and scopolamine, gr. 1/150, one hour before operation. Ten minutes beforehand ephedrine, gr. ½, is given intramuscularly. On arrival in the operating room nembutal in 5 per cent solution is injected slowly intravenously until the patient is asleep.

He is then sat up with the knees flexed and head bent forward. Spinal puncture with a fine needle is performed without preliminary local anæsthetic. The injection is made either between L. 1-2 or L. 2-3 (1st or 2nd lumbar space). The selected dose of nupercaine, 1/1,500, is then injected, taking 25 seconds by the clock for the injection. The patient remains sitting with the head well forward for a further 60-100 seconds and is gently but rapidly lowered to a supine position with no pillow. It is unnecessary to tilt the table to prevent upward spread. Unconsciousness is then induced with nitrous oxide and oxygen, using enough oxygen to maintain a good colour. The operation can usually be commenced within five minutes of the injection time, but twice anæsthesia has taken more than ten minutes to fully develop.

If a fine needle is used and care taken to prevent the loss of cerebrospinal fluid, it is unnecessary to raise the foot of the bed on return to the ward and the patient may sit up in Fowler's position in six hours. The author has used this method in 25 cases including 14 men, aged 25 to 64 years, and 11 women, aged 18 to 78 years. The operations lasted from 20 minutes to 3 hours, or an average of 57 minutes. The dose of intravenous nembutal varied from 1 to 6 c.c. of a 5 per cent solution, the average being 4.3 c.c. The dose of nupercaine varied from 5 to 9 c.c. of a 1/1,500 solution. The time sitting up was between 60 to 100 seconds after the initial 25 seconds for the injection.

No appreciable fall in blood pressure occurred, and the pulse tended to be slow and rarely varied by more than 15 per minute. It is difficult to estimate accurately the extent of anæsthesia in a semi-conscious patient but the author feels that the upper limit in these cases is decided by the size of the dose of nupercaine and not by the time he remains upright, provided this is sufficient for full spread to occur. One man who was sat up for five minutes following the injection of 8 c.c. of nupercaine suffered no ill effects at all.

The doses found satisfactory are 9 c.c. for a big and muscular man; 8 c.c. for a big woman or an average man; and 7 c.c. for an average woman or small man. F. ARTHUR H. WILKINSON

Therapeutics

The Control of the Dosage of Antiserum in the Treatment of Pneumococcal Pneumonia. I. A Study of the Mechanism of the Skin Reaction to Type Specific Polysaccharide. Wood, W. B.: *J. Clin. Investigation*, 1940, **19**: 95.

The immediate wheal and erythema skin reaction to pneumococcal capsular polysaccharides which has been observed in patients convalescing from pneumococcal pneumonia is due to a local union of polysaccharide and antibody in the skin as evidenced by the following facts: (1) Type-specific pneumococcal antibody is invariably present in the blood of patients convalescing from pneumonia who react positively to the intradermal injection of capsular polysaccharide. A reaction occurs only when the antibody and polysaccharide are of the same type. (2) By injecting locally at the same site antiserum and capsular polysaccharide of homologous type an immediate wheal and erythema dermal reaction, simulating exactly the Francis skin reaction, has been produced in normal persons who do not react to the polysaccharide alone. (3) Positive skin reactions to pneumococcal capsular polysaccharide have been passively transferred to negative reactors by previously sensitizing the skin locally with intradermal injections of blood serum obtained from convalescent patients adequately treated with antipneumococcal serum. Evidence is presented that the factor transferred in the donor's blood serum is the type-specific pneumococcal antibody.

The skin reaction to capsular polysaccharide depends not on the mere presence of homologous type-specific antibody in the blood but upon the titre of antibody present. In support of this view it has been shown: (1) that relatively large amounts of antibody must be injected with homologous polysaccharide to produce the characteristic dermal reaction in normal persons who do not react to the polysaccharide alone; and (2) that patients with pneumonia who are being treated with antipneumococcal serum do not react to polysaccharide as soon as antibody in the blood, but only after a relatively large amount of antibody has accumulated.

The Francis skin reaction is also dependent in part upon the state of reactivity of the skin. It has been demonstrated that positive reactions are not due solely to an increase in cutaneous reactivity occurring at the time of recovery, but that the skin may occasionally lose its ability to react to capsular polysaccharide during the course of severe pneumonia. The loss of cutaneous sensitivity seems to be associated with general toxæmia and probably explains the persistently negative reactions observed in patients who die of pneumonia in spite of the presence of appreciable amounts of antibody in the blood.

S. R. TOWNSEND

The Control of the Dosage of Antiserum in the Treatment of Pneumococcal Pneumonia. II. The Clinical Application of the Francis Skin Test. Wood, W. B., *Clin. Investigation,* 1940, **19**: 105.

Fifty-one patients with lobar pneumonia caused by pneumococci of types I, II, III, IV, V, VII, and VIII were treated with antipneumococcal serum. The dosage of antibody administered in each case was controlled by frequent skin tests with homologous pneumococcal polysaccharide (Francis' skin test). Five patients reacted to the polysaccharide before antiserum had been given. In none of these cases could the Francis skin test be used as a guide to serum therapy. The amount of antibody required to control the pneumonia in the cases studied varied from 11,000 to 1,983,000 units. Use of the Francis skin test made it possible to treat each patient intensively without wasting antiserum. In every case in which a crisis occurred the Francis skin reaction became positive several hours before or during the fall in temperature. The skin test served as a valuable aid in the early diagnosis of the complications of pneumonia. In every case in which the fever persisted in the presence of a positive skin reaction pleurisy with effusion, empyema, meningitis or endocarditis were subsequently demonstrated. No patient who failed to develop a positive skin reaction survived the pneumonia. Three who died reacted positively shortly before death; two died of pneumococcal complications, and the third died of uræmia, no evidence of active pneumonia being found at autopsy. The Francis skin test was also found to be of value in determining the optimum dosage of antibody in the treatment of patients who had previously received sulfapyridine. S. R. TOWNSEND

The Use of Dilantin in the Treatment of Epilepsy. Kimball, O. P. and Horan, T. N.: *Ann. Int. Med.,* 1939, **13**: 787.

In a study covering 220 cases of epilepsy in children and young adults the authors confirm the general high opinion of dilantin as an anticonvulsant, showing 55 per cent of cases completely controlled, 20 per cent partially controlled, and only 25 per cent not responding. However, 10 per cent of the cases showed a rash resembling measles, sometimes accompanied by elevation of temperature, and in some there were vertigo, mental confusion, ataxia and a mild psychosis. The most serious complications were sore mouth with spongy, bleeding gums and gastric irritation. The gastric symptoms consisted in pain and soreness in the epigastrium with nausea and vomiting, and gastroscopic examination in one case revealed an area of old hæmorrhage on the posterior gastric wall.

The authors feel that the gastro-intestinal and mouth complications are possibly to be prevented by giving high vitamin C diets, supplemented by cevitamic acid by mouth. G. A. COPPING

Pathology and Experimental Medicine

Identical Twins, One Suffering from Petit Mal, Both with Abnormal Encephalograms. Critchley, M.: *Proc. Roy. Soc. Med.,* 1939, **32**: 1417.

Twin boys aged 10, of the monozygous type, are the patients. One had had petit mal attacks for two months. The other had developed a habit spasm of the facial muscles during the past month. Both had abnormal encephalograms, which were very similar. Thus these twins, who would be used as examples of identicals twins with dissimilar inheritance if only the manifestation of epilepsy were considered, are examples of twins with a similar inheritance as far as the basic cortical dysrhythmia is concerned. There is of course the distinct probability that the second twin may develop actual epilepsy. MADGE THURLOW MACKLIN

The Inheritance of Epilepsy as Revealed by the Electroencephalograph. Lennox, W. G., Gibbs, E. L. and Gibbs, F. A.: *J. Am. M. Ass.,* 1939, **113**: 1002.

Although the belief that inheritance plays a rôle in epilepsy is widespread, only one epileptic in five is able to name a relative who had epilepsy. This has tended to make observers deny to heredity any rôle in epilepsy. These workers, who describe epilepsy as a paroxysmal cerebral dysrhythmia, felt that abnormal encephalograms might be found in relatives of epileptic persons who had as yet exhibited no outward manifestations of the condition. Simultaneous records were made over 6 areas of the brain, since an abnormal rhythm may be limited to but one area. One hundred and thirty-eight relatives of 76 epileptic persons were examined, 100 of them being parents and 20 of them being siblings or children of the epileptic patients. Of these 138 54 per cent had definite dysrhythmia; while in the control group of persons who had no epileptic relatives, only 6 per cent had definite dysrhythmia. Therefore abnormal records were nine times as frequent among relatives of epileptic as among relatives of non-epileptic persons. In 94 per cent, one parent was definitely abnormal as far as the record was concerned; in 4 other cases, also 4 per cent, one parent was normal and the record of the other was doubtful; in but one case was the record of both parents normal. The conclusion seems inescapable that even when a patient gives no history of epilepsy in his ascendants one or both of his parents may have a cortical dysrhythmia, and one or both are carriers of the disorder. The workers suggest that cortical dysrhythmia may be due to a dominant inherited factor. This work is of interest in that it suggests what is the inherited trait that is responsible for the symptoms of idiopathic epilepsy, and that the

basic disorder of epilepsy is definitely hereditary. Persons who have such cortical dysrhythmias, although not epileptic themselves, can produce epileptic offspring. MADGE THURLOW MACKLIN

Hygiene and Public Health

Primary Tuberculous Infection Attack Rates. Stewart, C. A., Harrington, F. E., Myers, J. A., Boynton, R. E., Chiu, P. T. Y. and Streukens, T. L.: *J. Am. M. Ass.*, 1939, **113**: 2204.

The observations reported in this paper were made recently on 3,868 persons representing five groups in Minneapolis and St. Paul, Minn. The five groups were, children, parents, students, medical students, and pupil nurses. The conclusions are based on tuberculin tests.

Of 1,278 children of an average age of 6.4 years 5.2 per cent reacted positively to 0.1 milligram of old tuberculin, an average annual infection rate of 0.8 per cent. Of 1,192 parents with an average age of 36.3 years 57.6 per cent reacted positively, an annual infection rate of 1.6 per cent. Students (other than medical students), who entered college with a negative reaction showed an annual infection rate of 1.5 per cent. Of 289 medical students in the first three years of their course, who on entrance reacted negatively to tuberculin, 24 became positive during the three years, an annual infection rate of 2.8 per cent. In these years the students were not working on a tuberculosis service. Two hundred and sixty-five students in their final year with a two weeks' tuberculosis service became infected to the extent of 44.5 per cent.

Data are given of 276 student nurses, who started training with negative tuberculin reactions; 84 were positive at the end of their training, an annual infection rate of 10.1 per cent. These girls were in private hospitals which maintained no beds for tuberculosis. Three hundred and forty-four student nurses in hospitals where 6 weeks' training in tuberculosis is provided, showed an annual infection rate of 59.3 per cent.

These figures indicate a high risk of exposure in the case of nurses and medical students. The authors believe that a technique might be developed which would in effect consider every new patient suspect until a negative tuberculin test or a thorough investigation of positive cases revealed that the danger of communicating the infection was small. Such suspects should be handled in the same way as cases are handled in communicable disease hospitals.

FRANK G. PEDLEY

Pilgrim, trudge on: what makes thy soul complain
Crowns thy complaint; the way to rest is pain:
The road to resolution lies by doubt:
The next way home's the farthest way about.
—*Francis Quarles.*

Obituaries

Harry Clifton Burgess, M.D.—Teacher, Physician, and Friend

A TRIBUTE FROM NURSES

On New Year's Day 1940, at the height of his career, Harry Clifton Burgess died—yet he lives and will continue to live in our hearts, the hearts of those who revered him for his exceptional abilities and skills and who loved him for his innate kindness and loyalty —the nurses; thus we cherish a vivid and lasting memory of him who was at once our beloved teacher, kind physician, and loyal friend.

As a teacher (for he taught student nurses for more than thirty years) we remember Dr. Burgess for the brilliance of his lectures, each a classic in its simplicity and adherence to sound facts and principles, and we have since learned well the wisdom of his precepts and the logic of his reasoning; we remember, too, his keen sense of humour and appreciation of the ridiculous — yet, for all the laughter we enjoyed at his lectures, never once did he allow us to forget the seriousness of his text. We remembered what he taught us—and he taught us well. He was, indeed, a brilliant teacher, yet his brilliance was never consciously exhibited, for he possessed as well the humility of the truly great.

We remember him for his kindness to us and his loyal support of nurses and nursing in general; he always took an interest in us and in our work and we are deeply grateful. His attitude toward us, whether as undergraduate or graduate nurses, was ever one of confidence and trust and one that inspired us to give of our best in his service; and he had the rare and inestimable quality of creating in the patient's mind that same sense of complete confidence in the nurse which characterized his own attitude toward her. In this he proved himself to be a great psychologist as well as a great physician; he knew the human body and he knew the human mind.

In times of sickness his kindness to the nurses knew no bounds; he gave freely of his time, talent and skill, never sparing himself, to all who sought his advice, and their numbers are legion. He was our physician—*our* Dr. Burgess.

We mourn him as only those who have loved and served their fellow-men are mourned, but his memory will live in our hearts—the hearts of the nurses.

Dr. Edward L. Belleau, Arthabaska, Que., died about March 2, 1940. He was born in 1855 and was a graduate of Laval University, Quebec (1880).

Dr. Andrew Arthman Bruère, of Montreal, died on February 24, 1940, in his seventy-seventh year.

Dr. Bruère was born in the British West Indies on November 10, 1863, and graduated from the University of Edinburgh (1887). Later he did post-graduate work in Paris and was then appointed demonstrator in physiology at the University of Edinburgh.

Dr. Bruère was noted for his high scientific attainments and became, on coming to this country, Professor of Bacteriology in the University of Bishop's College. On the amalgamation of this medical school with that of McGill University (1904-05) he was placed in charge of the Clinical Laboratory of the Royal Victoria Hospital, Montreal. Dr. Bruère also held a number of teaching appointments at McGill University. He was lecturer in dermatology and clinical medicine there from 1907 to 1920, and from 1920 to 1931 held the position of assistant professor of bacteriology. He had been in retirement since July, 1931.

Dr. Campbell Davidson, of Qualicum Beach, B.C., died on February 16, 1940. He was the son of the late Chief Justice Sir Charles Peers Davidson.

Dr. Davidson, who was in his 63rd year, was born and educated in Montreal, attending Tucker's Grammar School, and later McGill University. He graduated in medicine in 1898. He was a member of the old Victoria hockey team for a number of years.

After graduation, Dr. Davidson became a ship's surgeon, and was engaged on several ships plying between Canada and different parts of the world, remaining in this work for nearly 15 years. Subsequently he took up general practice in British Columbia, settling in Qualicum Beach. He was in charge of a soldiers' hospital established there during the Great War, later reverting to private practice.

Dr. Paul Ewert, aged fifty-six, former resident of Gretna, Manitoba, died on February 4, 1940, at his home in Golden, B.C. Born in Newton, Kansas, he moved to Gretna in 1891 and graduated from McGill in medicine in 1912. He had practised in Golden since 1914.

Dr. Clarence Greely Folkins, of Stanley, N.B., died in the Royal Victoria Hospital, Montreal, on February 24, 1940. Dr. Folkins was sixty-four years old. He was born at Upper Millstream, Kings Co., was educated in the public schools of New Brunswick, and graduated from McGill University in 1904. Except for two years he had practised continuously at Stanley.

Dr. Harvey Elgin Hicks, pioneer medical man of Manitoba, died at Griswold on February 18, 1940, in his seventy-sixth year. He was born at Melford, Ont., and came to Manitoba in 1891, graduating in medicine from Manitoba in 1897. He began practice at Griswold. In 1903 he was elected M.L.A. for Lansdowne. After his term in the legislature he did post-graduate work in Great Britain, and in 1910 joined the staff of the Brandon Mental Hospital, becoming Superintendent in 1915. He became a member of the C.A.M.C. in 1918; practised for about seven years at Oak Lake, and in 1926 retired from medicine and devoted his time to farming.

Dr. John Green Hossack, of Innerkip, Ont., died on February 25, 1940. He was born in 1871, and graduated from the University of Toronto in 1898.

Dr. Thomas Erlin Kaiser, a graduate of Victoria University in 1890, died at his home in Oshawa on February 29, 1940, in his seventy-eighth year.

Of United Empire Loyalist descent Dr. Kaiser was born at Edgely in the County of York. He began practice in Oshawa in the year 1890. In 1896 he married Louise C. Lister, of Hamilton (daughter of the late Joseph Lister), who survives him. His one daughter, Josephine, died in May, 1924.

His passing removes from the civic and professional life of Oshawa one of the most colourful, public-spirited and outstanding members of our community. While until of recent years he conducted a large and successful medical practice, he interested himself in and pioneered a great many civic enterprizes. He was an active promoter of the Hydro-Electric as a provincial undertaking, the Oshawa General Hospital, Oshawa Library and Board of Education. He was a member of the County Council, Mayor of Oshawa and member of the Town Planning Commission. For fourteen years he was a member of the Provincial Board of Health; was a member of the first Water Commission of Oshawa in 1906, was a promoter and later honorary director of the South Ontario Agricultural Society, was President of the Ontario Cemeteries Improvement Association. He was in fact actively associated with almost every worthwhile community effort in his fifty years of residence here. A life-long Conservative in politics, he was elected to the Federal House of Commons in 1925-26, defeated in 1930. He was actively interested in the work of the fraternal societies, the Masonic Order and the Foresters.

Dr. Kaiser was the author of "Historic Sketches of Oshawa", published in 1921 and "The Doctors of Ontario County", in 1934. He conceived and helped erect the Oshawa War Memorial, "The Garden of the Unforgotten."

He leaves a host of friends who will not soon forget him and a record of service such as few medical men can hope to equal.

Lawrence Edward Keegan, C.B.E., B.A., M.D., L.R.C.S., L.R.C.P., of St. John's, Newfoundland, died at Grand Falls, Nfld., on February 9, 1940, from the effects of a stroke of paralysis. He was born in Dublin, Ireland, in February, 1866.

After a preliminary education in the Jesuits' College and the Marist Fathers' School, Dr. Keegan graduated in medicine at Trinity College, Dublin, in 1896, having previously been L.R.C.P. and L.R.C.S. (Ire.) 1888. In 1889 he came to St. John's, Newfoundland. He practised generally for ten years, being associated with the Hospital for Mental and Nervous Diseases. From 1898 to 1901 he was Superintendent of this institution. In 1909 he was appointed Chief Surgeon of the St. John's General Hospital as well as Medical Superintendent. He retained both positions until July, 1935, when he retired. During his long career Dr. Keegan gained a notable reputation as a surgeon. Particularly must be mentioned the skilful work performed upon casualties among the members of the Newfoundland overseas forces in the last war.

Dr. Keegan organized the Newfoundland Medical Society in 1922, and was its first president. An eloquent speaker, his addresses were always a special feature of the gatherings of the Society. The General Hospital during his tenure of office was kept abreast of the times in technique and equipment. Indeed, it may be said that the names of those who have owed their lives to the ministrations of this distinguished surgeon are legion. Newfoundland mourns the passing of a Master Surgeon, a litterateur, sportsman and gentleman.

Dr. Edward Lorne McIntyre, of High Prairie, died recently in Cleveland, where he had gone for special attention.

Dr. McIntyre graduated from Toronto University in 1911 and registered that year with the Ontario College of Physicians and Surgeons. He practised for eight years in Ontario, when he came to Alberta and settled in the Peace River district, which at that time was just being settled. He was a big-hearted, genial, general practitioner and many a call he made over almost impossible roads, or no roads at all, to meet the needs of some pioneer homesteader. He was interested in his profession and no member of the Alberta profession was more faithful in his attendance of the refresher courses of the Alberta University. As a hobby he had a farm and furnished railway contractors with many a carload of the choicest hay during the construction period.

Dr. Ernest Wilson McNiece, of Aylmer, Ont., died on January 20, 1940. He was a graduate of the University of Western Ontario (1918). After returning from Europe in 1919 he set up practice in Springfield and three years later removed to Aylmer. Dr. Wilson was M.O.H. for both Aylmer and the township of Malahide.

Dr. George W. Staples died on February 23, 1940, at Carman, Man., aged seventy-eight. He graduated in medicine from Manitoba Medical College in 1896, and practised at St. Claude, Man.

Dr. Maxwell Wallace, of Emerson, Man., aged seventy, died on February 24, 1940, at Hallock Hospital, Minnesota. He was born in Scotland and came to Canada in 1886 with his father who farmed at

Niverville. In 1903 he graduated in medicine from Manitoba Medical College, practised for six months at Dominion City, and then took over the practice of Dr. S. Elkin at Emerson, where he continued to practise until his death. For ten years he was Chairman of the Emerson School Board, and also President of the Curling Club. He was buried at Emerson.

News Items

Alberta

Again in the middle of May will be held the annual Refresher Course of the University of Alberta and the local Division of the Canadian Medical Association. Plans are now in effect to bring in an outside speaker, who together with the university staff will provide the program. In order that the members may attend for a day or for a week, come and go as they like, there will be no registration fee. A plebiscite is now being taken as to special subjects the profession may desire to have discussed.

Dr. Roy Watson Culver, formerly of Simcoe, Ont., who for some years has been doing post-graduate work, has moved to Calgary to practise his specialty of eye, ear, nose and throat diseases.

Dr. F. T. Campbell, President-elect of the Canadian Medical Association, Alberta Division, Dr. George R. Johnson, and two clinicians, Drs. J. A. McPherson and Irving Bell, of Edmonton, are planning a tour of the various districts early in May. It is contemplated that the meetings will be held in consecutive order to save the time of the clinicians. G. E. LEARMONTH

British Columbia

A complimentary dinner to Dr. G. F. Amyot, the new Medical Health Officer for British Columbia, is being arranged, to take place at an early date. The British Columbia Medical Association is desirous of extending a cordial welcome to Dr. Amyot in his new position.

Miss Jessie M. Choate, the very capable and popular librarian of the Vancouver Medical Association's Library, is receiving congratulations on her recent marriage to Mr. William Van der Burg. She is resigning her post shortly, and will be a very badly-missed person. For several years she has filled a rather difficult and exacting position to the complete satisfaction of all who have come into contact with her. Her keenness and genuine efficiency, added to a most charming personality, have made her a very great asset to our Library, and it will be extremely hard to replace her.

The new "Medical Services Association", sponsored by the College of Physicians and Surgeons of British Columbia, has now been launched, and its benefits are now available to the public. Its object is to give a complete medical service to groups of employees, no matter how small, on the same basis that underlies the health insurance plans now in operation with such organizations as the B.C. Telephone Co., the B.C. Electric Railway Co., the B.C. Federation of Teachers and others. Free choice of doctor, and payment to the latter from a schedule of fees based on that of the College of Physicians and Surgeons of British Columbia are two of the underlying features. Dependents are included.

At the beginning this scheme will be limited to the Greater Vancouver and New Westminster areas, and only those whose incomes are under $2,400.00 a year will be eligible.

British Columbia joins with the rest of Canada in lamenting the passing of Dr. John A. Amyot, the well-known former Deputy Minister of the Federal Department of Health.

Dr. Amyot's life and career had been colourful and full of variety. He had a most distinguished war record, was given the C.M.G. by His Majesty King George V, and the Cross of the Legion of Honour by the French Government, was mentioned in despatches three times. All these and many other distinctions are matters of record, and in the words of the old Hebrew essayist, "He travelled through the land of strange nations: for he hath tried good things and evil among men . . . if he continue, he shall leave a name among a thousand, and if he die, he addeth thereto."

The question of a Provincial Medical Benevolent Fund, to apply to medical men and their dependents throughout the province, is now being investigated by the Board of Directors of the British Columbia Medical Association, with a view to early action.

J. H. MACDERMOT

Manitoba

An annual D. A. Stewart Memorial Lecture has been established by the Faculty of Medicine, University of Manitoba. The first of these lectures was delivered by Dr. E. W. Montgomery in Theatre A of the Medical College on February 28th at 10 a.m. Members of the Faculty, of the Sanatorium Board of Manitoba, students and friends of the late Dr. Stewart were present. Dr. Montgomery was a member of the Sanatorium Board from its beginning, and was later Minister of Health and Public Welfare for Manitoba.

Dr. J. D. Adamson, Professor of Medicine of the University of Manitoba, at a luncheon address to the Lions' Club at the Fort Garry Hotel on February 15th, suggested a Manitoba Government Health Insurance scheme to aid low- and medium-salaried groups in financing medical treatment. Details of any such plan must be carefully worked out by provincial and municipal authorities in co-operation with organized medicine, he added. These bodies would have to decide how the scheme would be supported, from what groups funds would be collected, and to what extent the scheme would be compulsory.

While the health needs of persons in homes where the annual income was below $1,000 were, on the whole, well taken care of by public authorities, the needs of the group with income ranging from $1,000 to $3,000, which represented 65 per cent of the population of Canada, were not provided for. People in this group could be financially crippled in event of a series of prolonged illnesses. ROSS MITCHELL

New Brunswick

Dr. E. C. Menzies of the Provincial Hospital was the special speaker at the monthly meeting of the Moncton Medical Society. As usual Dr. Menzies' address was of great clinical interest and the meeting was largely attended.

The Saint John Medical Society met in the Admiral Beatty Hotel on February 28th. The special speaker was Dr. R. A. Gregory, of the Provincial Hospital staff.

Major R. M. Pendrigh, R.C.A.M.C., recently succeeded Lt.-Col. A. Stanley Kirkland as Commanding Officer of No. 14 Field Ambulance stationed at Saint John, N.B. Lt.-Col. Kirkland had been released from his military duties at the request of the commissioners of the Saint John General Hospital.

Lieut. A. A. Rowan, of Fredericton, and Lieut. W. J. Murphy, of Saint John, have recently been attached to the 14th Field Ambulance of Saint John, N.B.

A. S. KIRKLAND

Nova Scotia

Nova Scotia, home of responsible government in Canada and stronghold of party politics, boasted only two medical men on its rostrum of candidates seeking election in the recent appeal to the people, Dr. D. J. Hartigan, New Waterford, and Dr. M. E. McGarry, of Margaree.

Dr. Gordon A. Winfield, of Halifax, is attached to the medical headquarters of the Canadian Expeditionary Forces, in London.

Dr. B. F. Miller, New Waterford, has taken up residence in Halifax, following his appointment as Deputy District Medical Officer to Medical District No. 6.

All Saints Hospital, Springhill, reported an excellent year for 1939, with a small credit balance on the ledger.

ARTHUR L. MURPHY

Ontario

On February 25th the new East Windsor Hospital was opened. It is to be used for relieving the General Hospitals of convalescent cases and incurables. It was officially opened by Wallace R. Campbell, Chairman of the War Supply Board of the Dominion, and Mrs. Campbell, President-elect of the Ontario Branch of the Red Cross Society. The hospital will have as Superintendent Dr. P. J. G. Morgan.

The formal dedication of the new hospital of Our Lady of Mercy on Sunnyside Avenue, Toronto, was held on February 12th, and the hospital was declared open for the reception of patients. It will house the 165 patients now cared for at the Mercy Hospital for Incurables on Sackville Street, and with 300 beds will relieve considerably the wards of the General Hospitals in the city. The hospital has been built and will be under the direction of the Roman Catholic Order of the Sisters of St. Joseph. The Hon. Albert Matthews, Lieutenant-Governor of the Province of Ontario, opened the hospital following its dedication by Archbishop J. C. McGuigan. The new hospital has a number of beautiful features, particularly in the airy, bright solariums on each floor. There is also a chapel, an auditorium, and provision for a large modern library.

To mark twenty-two years of service as Secretary of the Medical Staff of Hotel Dieu at Windsor, Dr. E. H. McGavin was the recipient of a handsome, silver tray given to him by his colleagues.

The thirty-sixth Annual Congress on Medical Education and Licensure was held at Chicago, February 12 and 13, 1940. Dr. Alan Brown, F.A.C.P., Professor of Pædiatrics of the University of Toronto, Faculty of Medicine, presented a paper on the "Rôle that a children's hospital should play in the community".

The first unit of the Victoria Hospital at London is now under construction. Building operations began late in September and have been continued through the winter. Two hundred and eighty feet long and forty-five feet wide, the addition will extend in front of the existing building with a communicating link. The old nurses' home has been demolished. The new building will have six storeys and a basement, the latter designed for the admission of patients and for out-patient services. The first floor will provide for offices of administration, the x-ray department, and a pathological museum. The second floor will be principally laboratories not only for the hospital but those necessary for clinical and pathological teaching and research. The upper floors will be for patients. It is expected that the new building will be ready for occupancy early in 1941.

The Canadian Mothercraft Society has been refused permission, because of objections by local residents, to construct a $150,000 Mothercraft Society Hospital on Cheritan Avenue, Toronto, in the north part of the city.

It was announced at Ottawa on March 7th that, in order to train Canadian physicians in the special problems of aviation medicine, a ten-week course was started dealing with this particular phase of medicine. Similar courses are being carried on in Vancouver, and it is expected further courses will be commenced as the British Commonwealth Air Training Plan swings into work later in the year. The course is being given by physicians who have been long associated with flying in Canada, as well as by experts of the Royal Air Force.

The meeting of the Guelph Medical Society of February 14th was addressed by Dr. Fletcher McPhedran, of Toronto, on "The neurological aspects of the duodenal ulcer".

Surgeon Commander Archie McCallum, of Toronto, has been appointed senior naval medical officer at Defence Headquarters in Ottawa.

The class of 1910, University of Toronto, Faculty of Medicine, will hold its first reunion to commemorate the thirtieth anniversary of graduation during the combined meeting of the Canadian Medical Association and the Ontario Medical Association in Toronto, June, 1940. An active local committee is preparing for a large attendance. Every member of the class has been written to and is urged to make his plans to be present.

J. H. ELLIOTT

Quebec

Dr. John C. Mackenzie, general superintendent of the Montreal General Hospital, has been appointed officer in charge of all hospital administration to the Canadian forces in England, with the rank of Major in the Royal Canadian Army Medical Corps.

Major Mackenzie left Montreal in mid-January to assume his new duties, which include the general responsibility for checking up on the hospitalization of Canadian troops in various hospitals and convalescent homes throughout Great Britain.

A start on the proposed Jewish Incurable Hospital, to be built on Sherbrooke Street East at a cost excluding the land, of $125,000, will likely be made in the spring. It was to have been commenced last September, but was postponed on account of the outbreak of war.

Saskatchewan

The Medical Officers of No. 10 Field Ambulance were the guests of honour of the staff of the Regina Grey Nuns' Hospital at a dinner meeting presided over by the president, Dr. F. J. Ellis. The officers so honoured were: Lt.-Col. B. C. Leech, Major J. M. Miller, Capt. H. J. Spooner, Capt. H. M. Graham, Capt. B. H. G. Curry, Lieut. G. W. Robson, Lieut. G. A. W. Currie, Lieut. M. W. Bowering, Lieut. J. E. Burch. In his address of welcome Dr. Ellis recalled the military history of Regina physicians. He said that in 1915 there were 35 doctors in the city, of this number 14 enlisted with the medical corps and went

overseas. This group included Drs. D. S. Johnstone, W. A. Harvie, W. R. Coles, Harry Morell, E. E. Meek, J. A. Cullum, J. B. Trudelle, J. Fields, W. A. Dakin, J. A. Henderson, W. M. Hart (now deceased), F. J. Ellis, D. Sweeney, and S. Ross. Of this group three died on service, Drs. Cullum, Meek and Henderson. Other members of the medical corps who saw service overseas and are now residents of the city are Drs. C. M. Henry, E. T. French, F. Guest, H. L. Jackes, R. McAllister, G. J. McMurtry, M. A. Carmichael, E. A. McCusker, J. T. Waddell, B. Martin and D. C. McRae.

A number of medical men, now residing in the city, who saw service overseas but in other branches of the service were Drs. M. A. Currie, G. Walton, C. F. W. Hames, J. C. Ritchie, B. C. Leech, and A. McMurchy. Dr. U. Gareau was with the Royal Navy.

Physicians who have left the city for active service include Lt.-Col. E. A. McCusker, Capt. F. Schroeder, and Surgeon-Lieut.-Commander D. W. Johnstone.

At the monthly staff meeting of St. Paul's Hospital, Saskatoon, on February 13th, it was decided that joint meetings with the Saskatoon District Medical Society be held every second month; the latter would provide the scientific program.

A lengthy report of the credentials committee was adopted. It recommended the promotion of associate members to the active staff at the end of one year, but advised that the work of such a member should be limited to his capacity and experience.

It was also suggested at the meeting that every alternate meeting in each hospital be devoted to discussion of cases and criticism of work done in the hospital. Such healthful control, it is thought, will do more to discourage undesirable practice than a rigid system of by-laws and regulations.

A very interesting clinical program followed. Dr. H. Sugarman spoke on "Living with heart disease". He discussed the general aspects of heart disease and illustrated his arguments with x-rays of such cases.

Dr. A. R. McPherson described an interesting case of subacute bacterial endocarditis with post-mortem report.

Dr. W. S. Holmes presented a case of pellagra. He described the signs and symptoms of vitamin B deficiency and its treatment. LILLIAN A. CHASE

United States

The American Society of Anæsthetists, Inc., is planning to publish its own journal, to be known as *Anesthesiology*. The Editor is Dr. Henry S. Ruth, of Philadelphia, Pa., and the Associate Editor is Dr. Ralph M. Tovell, Hartford, Conn. Dr. Wesley Bourne, of Montreal, has accepted the position of Contributing Foreign Editor for Canada for a period of two years.

American Board of Internal Medicine, Inc.—The American Board of Internal Medicine will conduct oral examinations just previous to the meeting of the American College of Physicians in Cleveland and just in advance of the meeting of the American Medical Association in New York City.

Applicants who have successfully passed the written examination and plan to take the oral examination in 1940, should advise the office of the Secretary at least six weeks in advance of the date of the examination they desire to take.

The next written examination for 1940 will be given on October 21st. Applications for this examination must be filed in the Secretary's office by September 1st.

Application forms may be obtained from Dr. William S. Middleton, Secretary-Treasurer, 1301 University Avenue, Madison, Wisconsin, U.S.A.

The New York Polyclinic Medical School and Hospital announces that it has established a special clinic for the hard of hearing. New patients are received on Tuesday and Thursday at 2.00 p.m. The clinic is under the direction of Dr. Samuel J. Kopetzky.

General

Report of the Banting Research Foundation for the Year 1938-1939

The Annual Meeting of the Trustees was held late in January, 1940, and at this meeting the annual report of the Honorary Secretaries was submitted. This revealed that twenty grants had been made during the year for aid in the prosecution of research projects, and that very satisfactory reports had been received concerning work performed on grants which terminated during the year.

It was noted in this report that from the character of the applications being received by the Foundation it was obvious that the modern trend of medical research is increasingly toward learning more about the formation, nature and action of substances which exert physiological effects and which, in deficiency, excess, or altered forms, induce pathological states. The relation of this type of research to a better understanding of many of the diseases of middle life which have not yielded to the researches of the Pasteur era was noted.

Grants made during the year.—Slightly less than half of the Foundation's income was placed at the disposal of Sir Frederick Banting in the Department of Medical Research, University of Toronto, to be used to finance research of his choice. The remaining and slightly larger portion of the Foundation's income was distributed to nineteen workers in various parts of Canada who submitted applications which were approved by the Trustees.

Summaries of reports made to the Foundation by nineteen persons in Canada who were working under individual grants which terminated during the year.

Dr. W. J. Auger, Department of Pathology, Hospital for Sick Children, Toronto, reports that by using carbon dioxide to stimulate the growth of pneumococci on solid media he has developed a practical means of isolating pneumococci in sputum. He also reports his results with regard to serum therapy and serum chemotherapy combined in lowering the incidence of empyema in Type I pneumonia in children.

Dr. K. W. Baldwin and Dr. A. W. Ham, working in the Department of Anatomy, University of Toronto, report that the epithelium in the respiratory portion of the fetal lung becomes discontinuous in the latter part of pregnancy and that capillaries thereafter form the chief lining of the alveoli. They suggest intrauterine respiratory movements are potent factors in affecting the position and growth of capillaries in the latter part of fetal life.

Mr. R. W. Begg, Department of Pharmacology, Dalhousie University, Halifax, reports that he has investigated the sedimentation-rate in 164 cases of disease, and is making a statistical survey of his results, to find if there is any correlation between sedimentation rate and the concentration of certain constituents of blood (cholesterol, plasma, proteins, etc.).

Miss M. G. Chapman, working in the Department of Anatomy, University of Toronto, reports that to date she has been unable to demonstrate in tissue cultures growth-stimulating effects of certain hormones comparable with those seen when they are injected into the living body.

Dr. H. B. Collier, Department of Biochemistry, University of Toronto, reports that he has studied the enzymic synthesis of plastein with papain from both peptic and papain digests of ovalbumin, as well as various factors affecting the synthesis. He also submits further evidence that plastein is a protein.

Mr. B. F. Crocker, Department of Biochemistry, University of Toronto, for the study of digestion in dogs prepared with the type of fistula he devised, is using protein labelled with deuterium in order to distinguish fed from secreted protein.

Dr. G. H. Ettinger, Department of Physiology, Queen's University, Kingston, reports his results with regard to assaying esterase in the human placentæ and his experiments in which œstrogens were not found to exert a cholinergic effect on the placentæ of common laboratory animals.

Dr. R. D. H. Heard, working in the Department of Biochemistry, Dalhousie University, Halifax, reports the isolation of a new saturated hydroxy-ketone from the neutral fraction of pregnancy urine.

Dr. W. Hurst Brown, working at the Western Hospital, Toronto, reports he has found no correlation between the efficacy of sulfapyridine in bacteriostatic tests and in the treatment of pneumonia. He also reports results of his studies on the absorption, distribution and excretion of administered sulfapyridine in eighty patients.

Dr. E. Kuitunen, working in the Department of Hygiene, University of Toronto, by means of facilities placed at her disposal by the Hospital for Sick Children, Toronto, has found the incidence of intestinal parasites in Toronto children to be much higher than is generally appreciated.

Mrs. H. T. Malloy, working in the University Clinic, Royal Victoria Hospital, Montreal, has investigated hereditary jaundice in rats and has found that it does not depend upon enhanced hæmolysis but rather on the inability of parenchyma liver cells to properly deal with blood bilirubin. The hereditary factor concerns parenchyma liver cells rather than hæmatopoietic tissue.

Dr. D. G. H. Macdonald, working in the Department of Physiological Hygiene, University of Toronto, reports the results of his study with regard to vitamin B deficiency and slow heart rate. It was found that this latter condition was due specifically to lack of vitamin B_1, but that it was not alleviated by B_1 alone; adequate food intake was needed as well.

Drs. D. W. G. Murray and R. G. MacKenzie, Department of Surgery, University of Toronto, report results on further experimental and clinical use of heparin. Heparin is shown to facilitate blood vessel surgery by preventing thrombosis. Its ability to prevent thrombosis in thrombophlebitis, as well as its ability to prevent further thrombosis and embolism in cases where it has already occurred, was also established.

Dr. B. Rose, University Clinic, Royal Victoria Hospital, Montreal, reports the results of several studies on histamine. The kidney was found to take up most of the histamine injected into the rat's blood stream. The kidney however was found to be devoid of histaminase. Adrenalectomized rats were unable to inactivate histamine. Injections of cortin restored their normal ability to inactivate it.

Mr. E. A. Ryan, working in the Department of Biochemistry, University of Toronto, reports that previously used methods have not been productive in allowing him to isolate and identify a new compound in male urine. New methods, have, however, been utilized which promise to be of considerable help in this and similar researches, and already there is indication that a new ketone has been found.

Dr. M. A. Sergeyeva, working in the Department of Physiology, McGill University, Montreal, reports that definite changes occur in the islet cells of the pancreas when the autonomic nerves supplying that organ are cut or stimulated experimentally. She has further found that under certain experimental procedures of this type numbers of cells displaying characteristics of both islet and acinar cells appear.

Drs. R. W. I. Urquhart and D. L. Selby, working in the Department of Pathological Chemistry, University of Toronto, report further progress with their study of experimental nephrosis. They have tested the effects of a standard damage to a more or less specific part of the tubule of one kidney with regard to the elimination of many ions in addition to the chlorine ion.

Dr. P. G. Weil, working in the University Clinic, Royal Victoria Hospital, Montreal, has found that normal persons do not excrete cortin. It was found, however, that cortin was excreted (1) in certain disease conditions and (2) following operations where its excretion reached a peak in four or five days. Studies on the relationship of cortin to surgical shock are in progress.

V. E. HENDERSON,
A. W. HAM,
Honorary Secretaries.

Book Reviews

Gross Anatomy. A. B. Howell. 403 pp. $6.00. D. Appleton-Century, New York, 1939.

Dr. Howell is Associate Professor of Anatomy at Johns Hopkins and his book is an exposition of the teaching procedure followed there. The introduction notes the present tendency to restrict the time given to gross anatomy in the medical curriculum.

It is time to view this tendency more critically. The exanding scientific basis of medicine logically demanded a re-apportionment of the time given to the historically all-inclusive study of anatomy. In some schools this demand is not yet properly met. In others it has been greatly overdone and a large part of the tendency to lose the patient in the laboratory, which so many clinicians deplore, can be traced to a superficial study and knowledge of the structure of that patient's body. Many attempts are being made to boil down anatomy to fit abbreviated courses. Given a fair share of time and efficient teachers, the problem is more of a minor one than is sometimes suspected. To overemphasize it is harmful and one is impressed in turning over the pages of this book that a doctor who had followed such a course would not be one's own choice for a physician because his knowledge would be woefully sketchy regarding anatomical facts pertinent to the daily run of the clinic. To expect him to learn such facts later and elsewhere relegates to others less favourably placed the anatomist's task of laying a broad and accurate foundation of anatomical knowledge. The author states "few even among instructors have the ambition to learn the contents of an anatomical textbook from cover to cover, else there would be no time left for research and the quality of instruction which research promotes." Experience shows the quality of instruction so promoted is not always the best. The primary purpose of a medical school, the training of practitioners, needs re-emphasis.

Although the book cannot be recommended for medical students it can, suitably edited, be of value for courses in anatomy for physiotherapists, nurses, and such like. The book is very well printed and written in a readable style, with the subject matter arranged by systems, and using the B.N.A. terminology. Where embryology or comparative anatomy is considered relevant it has been introduced, and the book is illustrated, but only with 56 line cuts.

Diverticula and Diverticulitis of the Intestine. H. C. Edwards. 335 pp., illust. $7.50. Macmillan, Toronto, 1939.

This monograph is a very concise, clear, and complete presentation of the subject. In the section dealing with Meckel's diverticulum the important contribution is the discussion on the incidence and clinical significance of gastric and pancreatic heterotopia. Gastric heterotopia is present in 1 in 3,000 per-

sons. Peptic ulceration with bleeding or perforation is the chief complication resulting from this.

The next chapter deals with non-Meckelian diverticula, the giant and cyst-like types.

The section on duodenal diverticula is one of the most complete that we have seen. Duodenal diverticula are classified into primary acquired, ulcer diverticula, and traction diverticula. The more common acquired type may be single or multiple, and occurs chiefly in the second part (peri-Vaterian) and also in the third part of the duodenum. Ulcer diverticula are a distinct group and form in the first part of the duodenum. They are produced by the contraction of scar tissue with the formation of pouches of normal bowel wall adjacent to the chronic ulcer. Diverticula of the jejunum, ileum and appendix are fully dealt with.

The most important contribution made in the book is in the discussion of diverticula of the colon. The etiology is summed up in the statement that "diverticula of the colon owe their origin to irregular contractions of the bowel musculature". The author states that it is impossible to distinguish clinically between diverticulosis and early diverticulitis. The treatment of both is the same.

The radiographic sign of the pre-diverticular state is an asymmetry of the haustral markings. The "saw-edge colon" represents the earliest demonstrable stage of true diverticulosis. An oblique view of the sigmoid will demonstrate diverticula that are not visible in the anterio-posterior position.

In the treatment of diverticulitis it is only the complications that call for surgical intervention. They are intestinal obstruction, perforation with peritonitis, localized abscess, and fistulæ. One feels bound to disagree with the author's remarks about the differential diagnosis between appendicitis with perforation and diverticulitis with peritonitis. Their differentiation is always difficult. The points of differentiation which are emphasized on page 264 are largely theoretical. The treatment recommended for this complication is unnecessarily drastic and fails to take account of the essential lesion, which is usually obstruction at the neck of the diverticulum with perforation beyond the obstruction. Simple drainage of the infected area is all that is required and will give a much lower mortality than excision with suture, colostomy or exteriorization of the inflamed bowel, as advocated by the author. In spite of this disagreement one can heartily recommend this book to those who are interested in diseases of the gastro-intestinal tract.

Tumours of the Skin. J. J. Eller. 607 pp., illust. $10.00. Lea & Febiger, Phila., 1939.

This book is most valuable to the general practitioner and to the dermatologist. Because of the ease with which cancer and pre-cancerous lesions of the skin may be observed early diagnosis and adequate therapy make possible a high percentage of cures. In fact the majority of cured cancers are those of the skin. Therefore, one cannot overestimate the value of a text stressing early diagnosis.

The majority of the clinical descriptions are expressed in simple English, the occasional expression "decreased hospitalization", though commonly used and accepted, may be worded simply and more attractively. The histopathological findings are thorough and bespeak the man of practical experience. The photographs in general are very good and are especially well adapted to show the best methods of treatment for lesions in a variety of locations.

Chapter six is devoted to the pre-cancerous lesions. Every physician should know the skin changes which are potentially malignant. The mortality from cancer would be further reduced if these danger signs were recognized.

The technique of x-ray and radium therapy is discussed in the chapter on general treatment of carcinomata. Treatment by electro-coagulation is given more prominence. A new feature is the chapter on surgical procedure in treatment of skin tumours. The chapter describes methods of excision, and closure to permit the best cosmetic effect.

One could not wish for a more complete bibliography. The book is clearly written, well illustrated, and easily understood.

Obstetrical Practice. A. C. Beck. 850 pp., illust. $7.00. Williams & Wilkins, Baltimore, 1939.

Dr. Beck has made a most excellent contribution to obstetrical literature. There are so many new and outstanding features in this book that one cannot comment upon them all.

The wide clinical experience of the author is revealed on every page, particularly in those portions dealing with the management of pregnancy, where many practical details, including vitamins and dietaries with an explanation emphasizing the rôle these play in obstetrical care, are clearly set forth. The various aspects of labour, presentation, position and posture with their significance are clearly described and excellently illustrated.

A chapter is devoted to the occiput posterior, which one might term the problem child of obstetrics, and a plea made for a rational understanding of the mechanism of labour in which such a position occurs.

It is refreshing to read a textbook on obstetrics which is not a glorified catalogue garnished with arguments and theories advanced in contemporary obstetrical literatures. By an extensive bibliography at the end of each chapter redundance is reduced.

This is an excellent practical textbook in obstetrics, easy of reading, thoroughly well illustrated and printed, and carefully arranged.

Sterility and Impaired Fertility. C. Lane-Roberts, A. Sharman, K. Walker and B. P. Wiesner. 403 pp., illust. $5.50. P. B. Hoeber, N.Y., 1939.

This excellent book presents in an orderly manner the present status of the question of sterility and impaired fertility. The problem is studied from both the male and female sides. The relationship between endocrine dyscrasia and sterility is discussed very thoroughly. A logical basis, according to present knowledge, is developed for therapy. The morphological study of the semen is presented in a clear manner, as is the association between a normally functioning female genital system and those signs which mark it. The investigation of the problem of sterility has developed almost beyond the field of the individual. It is obvious that a study so specialized demands the co-operation of a number of highly trained observers.

All who are interested in this nationally important subject will appreciate the honest manner in which the authors have presented their material. This is especially timely when so many expensive and widely advertised endocrine and vitamin preparations are being used to correct conditions which are very indifferently understood.

Introduction to Medical Mycology. G. M. Lewis and M. E. Hopper. 315 pp., illust. $5.50. Year Book Publishers, Chicago, 1939.

This book should be in the hands of all general practitioners, and since more and more attention is being paid to fungous diseases will go a long way in establishing mycology in its true relation to bacteriology.

This book is beautifully illustrated with excellent photographs of all the common fungous diseases of the skin, hair and nails. Great pains have been taken to show the variation in cutaneous manifestations of fungous diseases. Non-mycotic diseases are shown, to assist in differential diagnosis. In all there are 368 photographs.

Treatment is described in great detail, covering many clinical types, and preventive measures are con-

sidered. This is one of the great values of the book.

Part II is devoted to laboratory procedures, and here again minute instructions are given of methods which can be used in routine office practice.

Altogether this is an excellent monograph produced by the co-operation of a clinician and expert mycologist, beautifully illustrated and produced on the finest paper.

It should be of great use to the profession.

Anæsthesia. A. M. Dogliotti. Translation by C. S. Scuderi. 680 pp., illust. $7.50. S. B. Debour, Chicago, 1939.

This attractively bound volume on the entire field of modern anæsthesia by an outstanding Italian anæsthetist represents a distinct contribution to contemporary anæsthesia literature. It is the first Italian treatise on the subject and, although strongly coloured by the personal opinions and preferences of the author, can be said to definitely contribute to the technique of anæsthesia by its exhaustive consideration of peridural anæsthesia as practised by the author.

Part I deals with the history of anæsthesia and the general concepts of anæsthesia as a whole. Part II treats of general anæsthesia and the technique for its administration. Part III is concerned with peripheral anæsthesia, and as almost half of the entire number of pages of the volume is devoted to this part of the specialty of anæsthesia it is obvious in which direction the author's particular interest lies.

There are several typographical errors to be found throughout the text, but a more glaring error is the association of the valuable research work of Lucas and Henderson on cyclopropane with "McGill University of Montreal", on page 242. These estimable members of the University of Toronto may not altogether relish their forcible relegation to a sister university, however noteworthy she may be in her own respective sphere.

One serious omission in the chapter on spinal anæsthesia, and nupercaine in particular, is the total absence of any reference to the technique of Etherington Wilson, which is noteworthy and in fairly wide use in England and Canada. This is hard to understand in the light of the amount of consideration the author has given to other techniques with nupercaine which are far less well known and much less practicable in application.

With due allowance for the above defects, the book still remains a valuable contribution from Italian anæsthesia, and as such is worthy of consideration by practising anæsthetists. For the beginner in anæsthesia it is not so well suited as other texts which deal with agents and techniques more in use in Canada and the United States.

Outline of Medical Psychology. E. F. Skinner. 173 pp. 6s. H. K. Lewis, London, 1939.

This short treatise is precisely what it claims to be—an "outline" of psychology from a medical point of view.

Because of the increasing attention which is being given to the study of psychology in medical schools today, it is doubtful whether such a superficial work would be adequate to the needs of the student. It is written in an easy popular style, and may satisfy the requirements for a minimum of information on the subject.

A Handbook of Elementary Psychobiology and Psychiatry. E. G. Billings. 271 pp. $2.25. Macmillan, Toronto, 1939.

This is an excellent handbook and should be very useful to students and practitioners. The general psychiatric types are presented in an abbreviated manner, but with such clarity that a picture of the commoner types of mental disease is readily obtained. In the chapter on the general principles of psychotherapy the author's description of the different therapeutic methods employed in this field should be particularly helpful to the general internist who is in search for some uncomplicated method of approach to those patients whose symptoms have a psychogenic basis.

Recent Advances in Medical Science. Sir Edward Mellanby. 62 pp. 75 cents. Macmillan, Toronto, 1939.

This is the Rede Lecture delivered before the University of Cambridge in April last. The subject is considered from the standpoint of its social and economic implications, on which its author is so well qualified to speak. Short chapters are given on the following topics. The Adoption of the Experimental Method in Medical Investigation; Advances in the Control of Human Disease; Medical Discovery and Social Life; Effects of Medical Science on Hospital and other Practice; Medical Knowledge as the Limiting Factor in Public Health Schemes; Health, Fertility and Populations; Medical Science and Tropical Countries. The statements in the book are supported by statistical tables, never boring, always informative. Medical men will welcome an authoritative exposition of a subject which to them is of vital importance. This book has a value much greater than its modest size would suggest.

A History of Science in Canada. Edited by H. M. Tory. 152 pp., illust. $2.50. Ryerson Press, Toronto, 1939.

This timely book is the outcome of a series of papers contributed to the program of the American Association for the Advancement of Science at its meeting held in Ottawa in 1938, which had the object of putting before the scientific men of the United States and Canada some information about the development and progress of scientific study in our country. It was decided to publish the material in book form and Dr. H. M. Tory, who is now the President of the Royal Society of Canada, and who writes the introduction, was chosen as Editor.

The subjects covered are geology, chemistry, botany, zoology, medical biology and practice, astronomy, mathematics, and physics, and these sections are written by men who are authorities in their respective spheres. The articles are well written, as would be expected, and bring together much material that previously was scattered about in various transactions, journals, and reports, and therefore not easily accessible. One could have wished that some reference had been made to certain notable contributions to science by Canadian medical men, notably, the discovery of insulin by Banting and Best and of parathormone and other like substances by Collip.

It is hoped by the General Editor that this book will commend itself to the Canadian people as the first instalment of the history of the scientific movement in Canada. It is our hope also.

A Mirror for Surgeons. Sir D'Arcy Power. 230 pp. $2.00. Little, Brown & Co., Boston, 1939.

This is a delightful little book. The reputation of its author would be sufficient to ensure this. Sir D'Arcy deals with twenty-two master surgeons, beginning with John of Arderne in the fourteenth century and ending with James Marion Sims in the nineteenth. The biographical sketches are short, only sufficient matter being given to orientate the particular surgeon in his time and place and to set forth his claim to distinction. Then, and this is a happy feature, the surgeon is permitted to tell in his own words about the operation or device which is associated with his name. The beautiful English of these early writers is somewhat of a reproach to us and is worthy of our attention, it may be remarked. The introduction is by Dr. Francis R. Packard.

Buy this book; there is much meat in it.

Health in Handcuffs. J. A. Kingsbury. 210 pp., paper-bound. 75c. Modern Age Books, New York, 1939.

The practice of medicine in Canada and the United States has so much in common that any authoritative discussion of the efforts being made in the latter country to improve the medical care for its citizens is of definite interest to us in Canada. No one could be better qualified to write concerning the effort put forth in the past fifteen years in the controversial cause of medical economics than John A. Kingsbury, former executive director of the Milbank Memorial Fund and a man who has played a leading part in the events he describes.

Dr. Kingsbury has traced the history of the movement which seeks to make available the services of all elements contributing to the promotion and preservation of the nation's health. In so doing he has discussed briefly, but with sufficient detail, the work of the Committee on the Costs of Medical Care, the National Health Conference of 1938, the American Medical Association's resolutions on September, 1938, Senator Wagner's National Health Bill and the public hearings devoted to it. None of this material is new to readers who have studied this field of modern medicine, but the essential facts are presented in a compact form, and in a concise, at times biting, style, all making for interesting reading.

The author is sympathetic towards practitioners of medicine but not to the leadership they have received from their national and state organizations. He says: "Physicians are inclined to be touchy when one calls attention to problems in organization and in finance. It seems to be difficult for them to appreciate that stating the problem is no criticism of them." He feels that "Medicine, which is above all else a profession, fell into a business world, and its relations to our changing society just 'growed up' like Topsy".

Dr. Kingsbury states most emphatically that organized medicine in the United States is felt by many to have relinquished the leadership in future planning for the health services of the nation that it should occupy. The natural corollary to this statement is that, so far as is possible, we in Canada should profit by this experience and make every effort to retain organized medicine in a position where it can make its influence effective when the inevitable need for changing methods in the provision of medical care makes itself felt.

Naturally, in so controversial a subject, the views of the author will be regarded with distaste and alarm by many. Nevertheless, this valuable study of current problems deserves a place on the book-shelves of all who are interested in the subject, and the modest price of the volume makes this possible.

Your Baby's First Year. M. C. Stopes. 283 pp. 5s. Putnam, London, 1939.

Were this book written by an unknown author it would scarcely have been worth the trouble of reviewing, and it would have passed silently into a well deserved oblivion. It is the name and notoriety of the author that makes necessary a more than casual attention to this her latest and most pitiful effort in the realm of sex and love and motherhood. This review is in truth an earnest attempt to prevent such a book from falling into the hands of parents of children who might not be able to distinguish pyrites from gold.

It is not clear on what basis Marie Stopes considers herself qualified to write a book on infant care, but it is quite obvious that what she has written has been with the zeal and fanaticism, nay, even the phraseology and style of an antivivisectionist. She demonstrates the same contempt for established scientific fact, the same derision of scientific medicine, and the same technique of damning medical men, while quoting liberally from their writings in order to make some of her points.

The book is badly written and abounds in misstatements and distortions which could easily mislead an uneducated layman. It seethes with contemptuous terms: "doctor ridden cities", "research blockheads", "ignorant scientists", "inquisition of doctors" are but a few of the choice terms she uses when she disagrees with some of the leading English pædiatrists. In contrast she offers some of her own bits of stupid and, at times, dangerous, advice. Here are a few: that goat's milk is far superior to cow's milk in feeding infants; that milk should never be diluted with water, but always with whey; that pasteurization is nothing short of criminal; that aluminum utensils are poisonous; and, worst of all, that if she had the choice of giving a baby either pasteurized milk or a raw cow's milk which was a little tainted with tuberculosis, she would most certainly choose the latter, and she would not boil it either.

This book is not without humour, however unintentional. Marie C. Stopes, D.Sc., Ph.D., F.L.S., believes in mental telepathy. Not the ordinary kind, no. She believes in telepathic communications between the pregnant mother and her unborn child! When fetal movements are too active it is only necessary to say to the child, "That will do now, Mummy is tired", to get an instant response. Thread worms are caused from eating codfish —she has seen the worms herself in the codfish flesh and suffered from them for seventeen years until she cured herself by omitting codfish from her diet and taking flowers of sulphur. Pure fats are better digested than cream, therefore as soon as an infant is old enough to roll a butter pat on his tongue he should be given one. Her choice of milk for children is, "delicious creamy milk of a herd of Jerseys", and straight from the cow to the baby's bottle. All official quarantines are too short for general absolute safety. One who constructs a nursery without an open-fire hearth is a criminal. She could write a whole book about the evils in adult life caused by the circumcision of Anglo-Saxon men.

And so the book moves merrily on, filled to the covers with balderdash of this type; fads and unimaginable fancies interspersed here and there with an odd grain of truth. Excellent light reading for a physician with a ripe sense of humour and a flair for the ridiculous! Dangerous in the hands of a mother who having first read "Contraception" and followed it with "Married Love", now, having had her baby, uses "Your Baby's First Year" as her guide. A veritable travesty of a treatise!

The Electrical Excitation of Nerve. B. Katz. 151 pp., illust. $3.25. McAinsh, Toronto, 1939.

The sequence of events which occur during and after the application of an electrical stimulus to a peripheral nerve form the subject matter of this review. Most of our knowledge of the physiology of nerve comes from a study of the behaviour of this tissue when it is stimulated. The electrical type of stimulus is almost always used because it can be readily controlled. For these reasons the present review covers a field of considerable importance and one of the greatest interest to the physiologist and neurologist.

The literature on the electrical excitation of nerve starts with the writings of Galvani, and has of recent years, assumed disconcerting proportions. Much of this source-material involves mathematical and physical concepts which are not familiar to most physiologists. Professor Nicolas Rashevsky in his recently published "Mathematical Biophysics" has covered this field from the viewpoint of the mathematician. Dr. Katz writes as a physiologist. The mathematical and physical concepts are stated in terms of observed properties, and by this means their significance, otherwise obscure, is made clear.

"The Electrical Excitation of Nerve" can be recommended to all those interested in this aspect of the biological and medical sciences as the only comprehensive treatment of the subject in the English language.

Sport, Physical Training and Womanhood. S. K. Westmann. 222 pp., illust. $3.00. Macmillan, Toronto, 1939.

In this book an analysis is made of many different kinds of physical activity; the anatomical, physiological and psychological differences between man and woman are considered, and explanations given as to why some types are good and to be highly recommended, some acceptable, some with questionable values, and some to be avoided as definitely harmful.

In general, medical education has rather ignored the therapeutic value of various types of exercise, and little or no attention has been given to an analysis of the striking physiological differences between statis, rhythmical and dynamic types of muscular exercise. Physiologists, especially those interested in the effects of exercise, will doubtless take exception to certain claims, particularly those regarding the values of "breathing exercises" and the relationship between physical capability and "lung capacity".

The author makes a definite distinction between competitive sports, exercises and gymnastics, and is to be commended for his frank and forceful attack upon the tendency of many women to "ape" man in the field of competitive athletics.

Heretofore, in problems of this kind, medical opinion has been largely confined to a discussion of the extent to which women should exercise during menstruation. The broader approach by the author is most encouraging. Counsellors and teachers will value further scientific bases upon which to build their practices.

The Building of a Nation's Health. Sir George Newman. 479 pp. $7.00. Macmillan, Toronto, 1939.

Sir George Newman has long been recognized not only as a distinguished public health authority but also as a brilliant scholar and writer. In the present volume he maintains his repute. From his post of vantage he has viewed, during many years, the transformation of human life in England, and now records his own personal observations of the manner in which these changes progressed.

The book will have a wide appeal, for not only does it deal with the field of public health in the narrower sense but it includes a detailed consideration of medical education and licensure, with a particularly interesting and instructive chapter on "Local Government" in England. In the words of the author: ". . . national health — in every country in the world, everywhere, and all the time—depends first upon knowledge of the science and art of Medicine, discovered, tested, verified, proved, and then upon its social application by the medical practitioner, by the State, and by the people of that State. Without that knowledge there is no knowing, without that application there is no going."

This is one of those exceptional books which will be read with both pleasure and profit.

Physiological Chemistry. A. P. Mathews. 6th ed., 1488 pp., illust. $8.00. Williams & Wilkins, Baltimore, 1939.

This textbook has a long and brilliant history of usefulness. This latest edition brings it well up to date and keeps it as one of the standard books for students.

Physiology in Health and Disease. C. J. Wiggers. 3rd ed., 1144 pp., illust. $9.50. Lea & Febiger, Phila., 1939.

This edition appears rather soon after the last one, but the author has found it necessary to restate and expand discussion on several points, *e.g.*, acclimatization, chest pains, endocrines, functions of the aorta, vitamins, prenatal respiration, and so on.

BOOKS RECEIVED

Die Biologische Reaktion. O. H. Bucher-Trumpler and C. C. Hofflin-Karwatzki. 263 pp. Schw. Fr. 42.50. Hans Huber, Bern, 1939.

Protozoology. R. R. Kudo. 2nd ed., 689 pp., illust. $6.50. C. C. Thomas, Springfield, 1939.

Radiotherapy in Sinusitis. W. A. Troup. 50 pp. 3s. 6d. Actinic Press, London, 1939.

Epidemiology in Country Practice. W. N. Pickles. 105 pp., illust. $2.25. Macmillan, Toronto, 1939.

Schafer's Essentials of Histology. Edited by H. M. Carleton. 14th ed., 618 pp., illust. $5.00. Lea & Febiger, Phila., 1938.

Pædiatric Surgery. E. C. Brenner. 843 pp., illust. $10.00. Lea & Febiger, Phila., 1938.

Baptism of the Infant and the Fetus. J. R. Bowen. 4th ed., 12 pp. $0.25. Copies may be obtained from the author, St. Joseph Mercy Hospital, Dubuque, Iowa, 1939.

Martini's Principles and Practice of Physical Diagnosis. Edited by R. F. Loeb and G. J. Farber. 2nd ed., 213 pp. $3.50. Lippincott, Montreal, 1938.

Lewis's Medical and Scientific Library. Part 2, 156 pp. 16s. complete. H. K. Lewis, London, 1939.

Fractures and Dislocations in General Practice. J. Hosford. 274 pp., illust. 12s. 6. H. K. Lewis, London, 1939.

Fever Therapy Technique. J. R. Ewalt, E. H. Parsons, S. L. Warren and S. L. Osborne. 161 pp. $2.50. P. B. Hoeber, New York, 1939.

Les Infections Humaines A B. Bipolaris Septicus. 126 pp. Fr. 4.80. Hans Huber, Bern, 1939.

Surgical Sutures and Ligatures. E. J. Holder. 64 pp. $0.45. Macmillan, Toronto, 1939.

Manual of the Diseases of the Eye. C. H. May. 16th ed., 515 pp., illust. $4.00. William Wood, Baltimore, 1939.

Headache and Head Pains. W. F. Dutton. 301 pp., illust. $4.50. F. A. Davis, Phila., 1939.

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Anæmia in Practice. W. P. Murphy. 344 pp., illust. $5.50. McAinsh, Toronto, 1939.

Forensic Medicine. D. J. A. Kerr. 3rd ed., 331 pp., illust. $4.50. Macmillan, Toronto, 1939.

Medical Jurisprudence and Toxicology. W. D. McNally. 386 pp., illust. $4.25. McAinsh, Toronto, 1939.

Failure of the Circulation. T. R. Harrison. 2nd ed., 502 pp. $4.50. University of Toronto Press, 1939.

Electrocardiograms. H. W. Jones and E. N. Chamberlain. 49 pp. $1.10. Macmillan, Toronto, 1939.

Common Skin Diseases. A. C. Roxburgh. 5th ed., 416 pp., illust. 15s. H. K. Lewis, London, 1939.

Manual of Diseases of the Eye. C. H. May and C. Worth. 7th ed., revised by M. L. Hine. 505 pp., illust. $4.75. Macmillan, Toronto, 1939.

Textbook of Midwifery. R. W. Johnstone. 10th ed., 491 pp., illust. $5.50. Macmillan, Toronto, 1939.

Economical Administration of Health Insurance Benefits. Part 1, Principle of Economy in Administration of Health Benefits. W. Pryll. 133 pp. $1.75 for three parts. International Labour Office, Geneva, 1938.

Biographies of Child Development. A. Gesell, M.D., B. M. Castner, Ph.D., H. Thompson, Ph.D. and C. S. Amatruda, M.D. 328 pp. $3.75. P. B. Hoeber, New York, 1939.